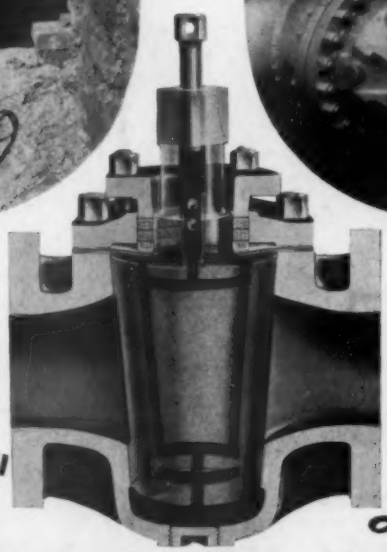
AMERICAN GAS JOURNAL

JULY, 1938

NORDSTROM

LOW PRESSURE

HIGH PRESSURE



Reduce unaccounted-for losses on city distribution lines. When closed, Nordstrom Valves are impenetrable. Lubricant under pressure seals the valves.

Leak-proof under high or low pressure. Always easy to turn. No grooves to clog. No stems to rust. Simplest, fool-proof construction.

"Sealdport" Lubricated

½-INCH TO 30-INCH VALVES ASK FOR CATALOG

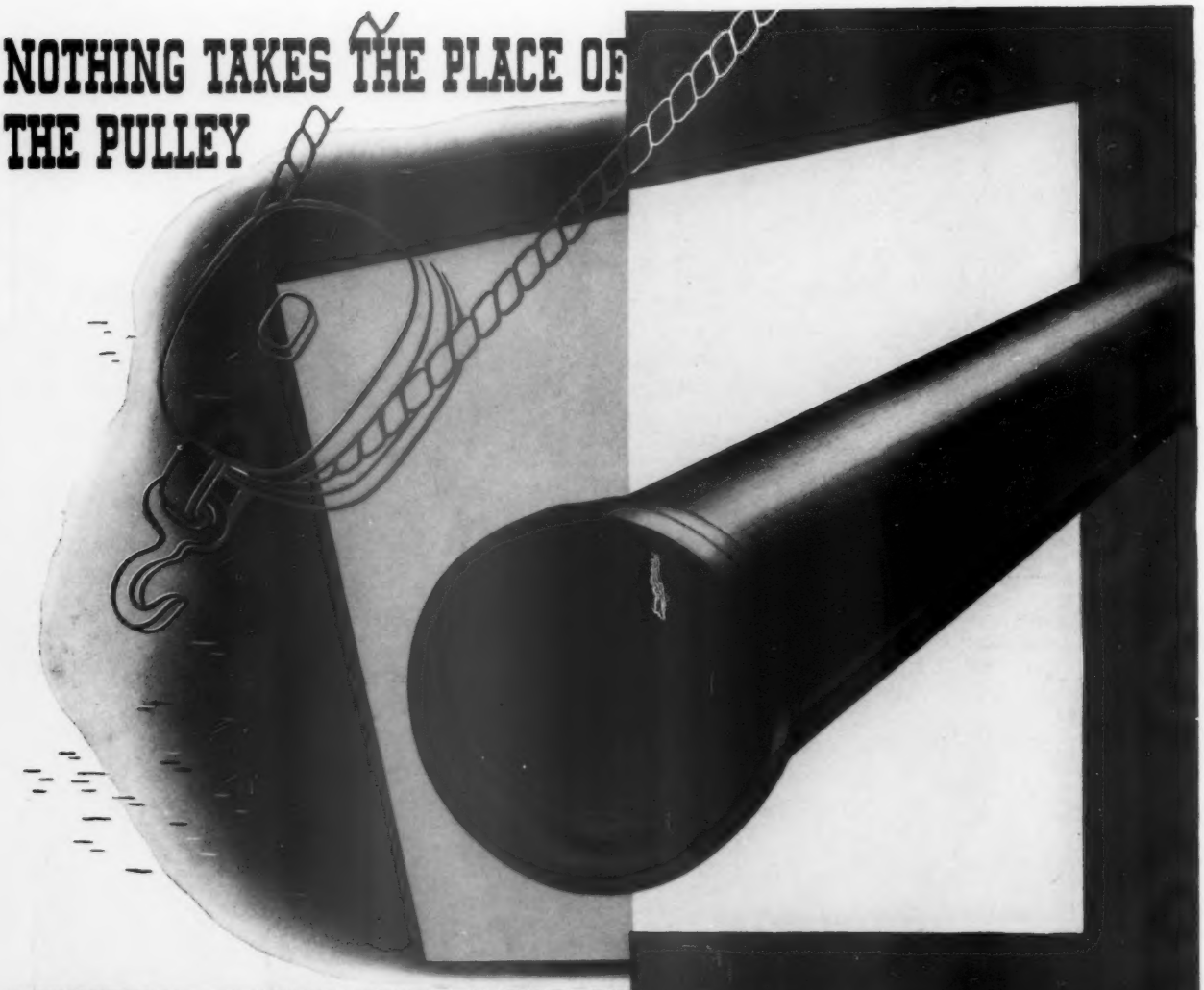
PRODUCTS — NORDSTROM VALVES; EMCO GAS METERS and REGULATORS; PITTSBURGH LIQUID METERS

MERCO NORDSTROM VALVE CO. *A Subsidiary of* PITTSBURGH EQUITABLE METER CO.

MAIN OFFICE: Pittsburgh, Pa. • BRANCH OFFICES: New York City, Buffalo, Philadelphia, Columbia, Memphis, Chicago, Kansas City, Des Moines, Tulsa, Houston, Los Angeles, Oakland. • CANADIAN LICENSEES: Peacock Brothers, Ltd., Montreal. • EUROPEAN LICENSEES: Audley Engineering Co., Ltd., Newport, Shropshire, England.

In Two Parts—Part I

NOTHING TAKES THE PLACE OF THE PULLEY



NOTHING TAKES THE PLACE OF

CAST IRON PIPE

THE STANDARD MATERIAL FOR UNDERGROUND MAINS

NOTHING serves the purpose so well as the *pulley*—nothing meets all the requirements of an efficient long-lived underground main so well as *cast iron pipe.* Both have been engineering standbys for centuries. Nothing takes their place.

If you demand *proved* long life and low maintenance cost that result from effective resistance to corrosion—assured safety margins for impact, beam load and crushing stresses—and permanently tight joints—then you will agree that *nothing takes the place of cast iron pipe.* Some materials meet some of these requirements but only cast iron pipe meets them all.

Two-inch cast iron natural gas main replacing substitute pipe that failed in six years, showing expansion joint connection to a remaining section of old main.

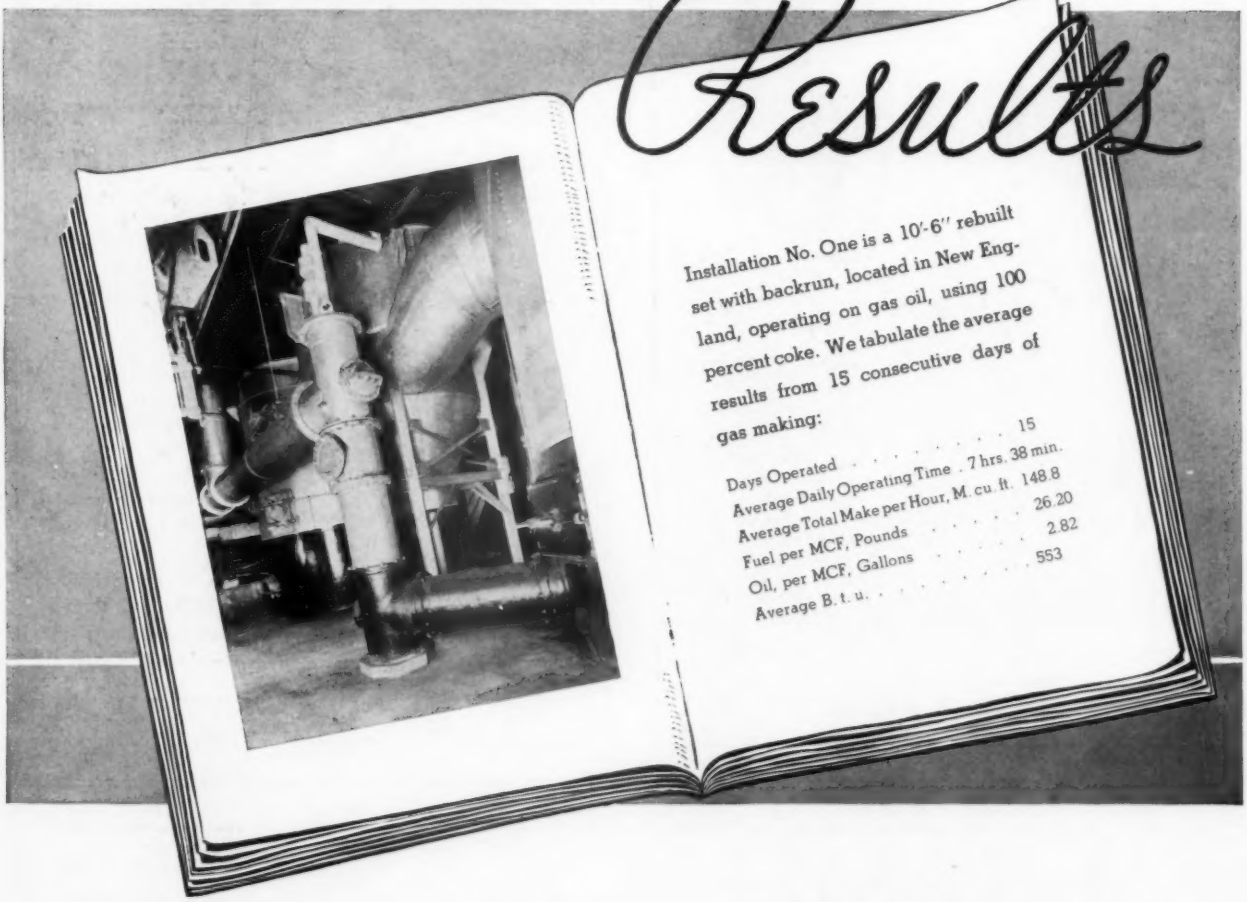
Look for the "Q-Check" registered trade mark. Cast iron pipe is made in diameters from 1¼ to 84 inches.

CAST Q IRON

THE CAST IRON PIPE RESEARCH ASSOCIATION, THOMAS F. WOLFE, RESEAR

AMERICAN GAS JOURNAL, July, 1938. Vol. 149, No. 1. Published monthly by American Gas Journal, Inc., at 34 North Crystal St., East Stroudsburg, Pa. Executive and Editorial offices at 53 Park Place, New York, N. Y. Entered as second-class matter, October 7, 1928, at the post office at East Stroudsburg, Pa., under the Act of March 3, 1879.

....REVERSE FLOW *Results*



Installation No. One is a 10'-6" rebuilt set with backrun, located in New England, operating on gas oil, using 100 percent coke. We tabulate the average results from 15 consecutive days of gas making:

Days Operated	15
Average Daily Operating Time	7 hrs. 38 min.
Average Total Make per Hour, M. cu. ft.	148.8
Fuel per MCF, Pounds	26.20
Oil, per MCF, Gallons	2.82
Average B. t. u.	553

FOUR SEMET-SOLVAY REVERSE FLOW WATER GAS MACHINES have gone into service. They are building up a record of results that more than justifies the enthusiasm of gas men for the process.

These machines are now making gas with both coal and coke as generator fuel—with bunker "C" oil or gas oil for enrichment at average city gas heating value—with coke and gas oil for high B.t.u. gas. They are meeting satisfactorily the requirements of calorific value, specific gravity and volume output.

The Semet-Solvay Reverse Flow Process is offered on its ability to deliver better yields from gas making materials and to lower the cost of gas in the holder. In substantiation of our claims, we shall let the machines built for Reverse Flow tell their own story in this series of advertisements. Figures presented offer a basis for comparison with individual plant records.

We believe it is possible to show that Reverse Flow can be installed in a majority of carbureted water qas plants, to yield economies and improvements that make it a most desirable investment. A preliminary calculation will be prepared without obligation for gas companies furnishing data on their present production.

SEMET-SOLVAY

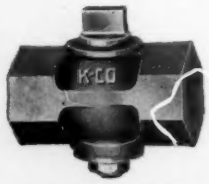
ENGINEERING — **CORPORATION**

Engineers — *Contractors*

SEMET-SOLVAY ENGINEERING CORP. WE SELL SOLUTIONS TO HARD PROBLEMS NEW YORK

40 RECTOR ST. — **NEW YORK, N. Y.**

GUIDE TO GOOD BUYING FOR 41 YEARS



G-501-R-Flathead Recessed Iron Body Brass Plug Gas Stop

G-515 Lockwing Iron Body Gas Stop

G-503-R-Tee Head Iron Body Brass Plug High Pressure Gas Stop with Recessed Threads

G-501 Flathead Iron Body Gas Stop

KITSON COMPANY

2409-15 Westmoreland St., Philadelphia, Pa.

Manufacturers of Kitson Safety Devices (Lovekin Patents) for Domestic Water Heaters . . . Quality Brass Goods for Gas, Water and All Plumbing Uses.

TITAN WATER HEATER CONTROLS

AGA Approved TITAN Temperature and Pressure Relief Valve

This device is installed on the hot water outlet in the tank directly in the flow of water. Action, as a result, is unfailing and positive, there being no dead pockets to prevent proper functioning of relief valve.

Pressure relief is obtained through a spring-loaded valve which opens when the pressure reaches a predetermined point. Should the water become overheated to 200° F, a fusible disc melts and lets the water escape thereby preventing a further increase in temperature.

The Titan Relief Valve serves as a coupling connected in the line thereby eliminating the necessity and expense of a tee fitting. To replace fusible disc, it is not necessary to disassemble valves or piping in any way.

Designed for application to storage or range boilers. Prevents corrosion, scalding and explosion.

Catalog and full information upon request.

The Titan Valve & Manufacturing Company

Thermostats • Safety Pilots • Relief Valves • Safetystats

9913 Elk Avenue Cleveland, Ohio

SUPERIOR

Diaphragms
Provers
Repairs
Service Cleaners
Gas Meters

SUPERIOR METER CO.

Brooklyn, N. Y.
167-41st Street

DEPENDABLE-

PERFORMANCE INSURED BY YEARS OF KNOWING HOW

Background is important.

We don't expect champions to breed from selling-platers. Neither do we look for a superior product from a company unversed in the art of its industry.

The Republic Burner is no freak of chance—no mushroom prodigy.

Twenty-nine years of intimate contact with combustion problems have gone into the development and perfection of the Republic.

Republic Flow Meters Company, our parent company, not only kept step with the march of combustion progress, but developed the very instruments to measure that progress. Steel, paper, gas, oil, chemicals, heating, and scores of other processes secured effective analysis and control of combustion through Republic instruments.

In view of the knowledge thus gained it is not strange that the Republic Burner for home-heating, from its inception, was a different burner—in no sense a copy of something else.

It takes more than courage to leave the beaten path. Republic not only had the courage but the unfailing compass of long and varied experience to guide its design along new paths to a new goal.

In spite of this unusual background Republic has never felt that its job was complete. Study the elemental design of the Republic Burner and you will find that its dominating characteristic is its adaptability to the job in hand.

Republic Burner principles are ever the same but their application is as new as tomorrow.

THE REPUBLIC CONVERSION HOME HEATER
THE REPUBLIC LO-BILL WATER HEATER
THE REPUBLIC GAS-FIRED HUMIDIFIER
THE REPUBLIC HEET-RE-TREEVER

AUTOGAS CORPORATION
2258 Diversey Pkwy. Chicago, Ill.

General Sales Agent REPUBLIC HEATERS SALES CO. CHICAGO, ILL.

STOP CAST-IRON JOINT LEAKAGE

the Inexpensive Way

with CARBOSEAL ANTI-LEAK

Trade-Mark

THE use of Carboseal anti-leak has become a routine procedure in the maintenance programs of over 200 gas companies. Many utilities have completely treated their entire distribution systems. Nation-wide experience indicates that the average cost of Carboseal anti-leak required per mile of 3-inch equivalent cast-iron main is under $100. Savings in terms of gas formerly lost have shown returns of 49 to 500 per cent on the investment.

Carboseal anti-leak corrects leakage in dry-gas distribution systems by permanently moistening and swelling the jute in cement or lead-caulked bell and spigot joints. Joints treated five years ago, and in contact with dry gas since then, remain 100 per cent tight on the soap test. Meter tests made on cast-iron mains, where no services were connected, showed complete elimination of leakage after Carboseal anti-leak treatment. Tests on mains with connected customers showed leakage reductions from 50 to 95 per cent after this treatment. In general, any remaining leakage was in the services.

From 2,000 to 5,000 feet of main a day can be treated without interrupting gas service. Carboseal anti-leak contains no volatile diluents which evaporate, and costs much less to apply than other lasting methods of stopping cast-iron joint leakage.

For further information write for Carboseal anti-leak bulletins which will be gladly sent without obligation.

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

UCC

30 East 42nd Street, New York, N. Y.

PRODUCERS OF SYNTHETIC ORGANIC CHEMICALS

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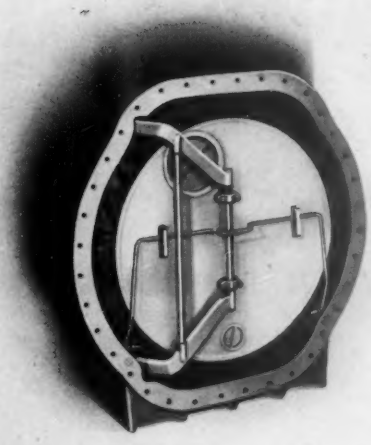
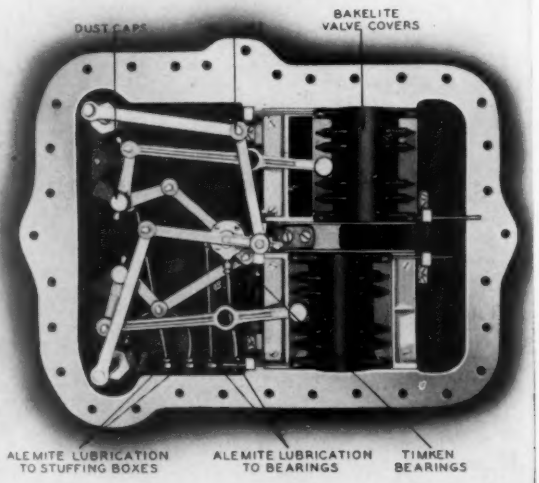
To the last *detail* . . .

After all, the accuracy and the economy of a meter over a period of years hinge not upon just one or two outstanding features . . . but upon every detail of design, materials, construction. METRIC IRONCASE METERS give you many outstanding features plus painstaking engineering to the last detail! . . . such as the body construction of fine gray iron cast in one piece to prevent internal leaks, and specially processed inside to resist corrosion.



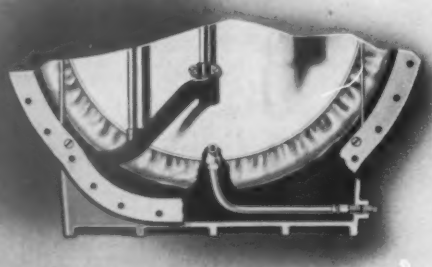
The back disc of the Metric Ironcase Meter diaphragm is fastened rigidly to middle partition. In the 500-B Ironcase Meter here illustrated, the step for the lower end of long flag rod is equipped with Timken bearings, that are Alemite-lubricated. Another distinctive feature is the full bellows, to insure accuracy throughout the entire Ironcase line.



This Slide Valve construction . . . characteristic of 500-B and 250-B Ironcase Meters . . . shows the reduced angular movement and the features of design which lessen friction and prolong wear. Special materials and metal alloys are used for valves and valve seats. Dust caps also protect the Alemite-lubricated bearings. Friction loss is cut to a minimum.

Write for information on Base Pressure Index or Base Volume Index which give a corrected reading for pressure or for pressure and temperature combined.

TYPE 500-B
With Base Pressure Index



Adequate provision for draining condensate from diaphragm and case interiors, contributes to efficient diaphragm action. The illustration shows drain connection . . . leading from the bottom of diaphragm to outside of case . . . utilized in Ironcase Meters 80-B and larger. Ironcase diaphragm leathers . . . in form, quality, special tanning and oil treatment . . . also are a highly important factor in accurate gas measurement.

ESTABLISHED 1836

AMERICAN METER COMPANY

INCORPORATED

Measurement and control of Gas, Oil, Steam, Air and Liquids

METRIC METAL WORKS *ERIE, PENNSYLVANIA*

825

These and other important features fully described in Catalog EG-40

JULY
1938

AMERICAN
GAS JOURNAL

VOLUME 149
No. 1

The Direct Fired Air Heater

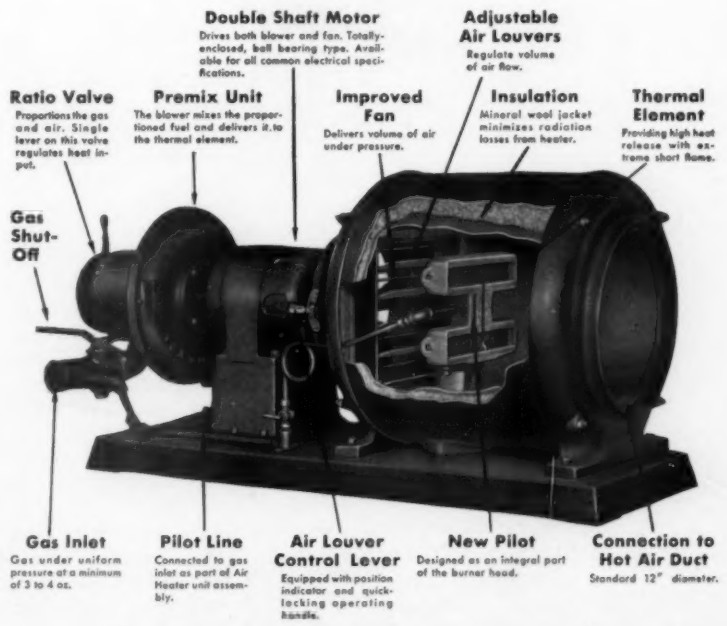
Characteristics, Advantages and Applications of This Equipment for Industrial Operations—Example of Calculations

by
Raymond F. Mann
Wentz-Mann Company
Kenmore, N. Y.

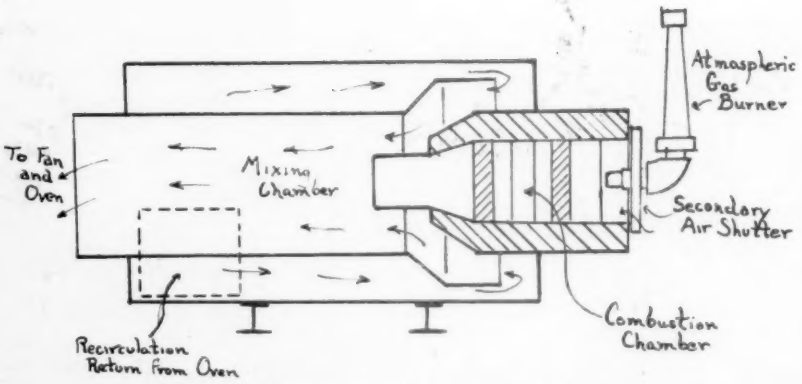
NO story of the outstanding developments in the field of industrial gas applications of recent years would be complete without full recognition of the value of the direct-fired air heater. In a period of less than ten years this style of equipment has taken a dominating position in the drying and japanning fields. As the name indicates heating and drying are done not by means of burners placed within an oven but rather through the medium of hot air generated outside the oven and carried to it through ductwork.

For temperatures below 1000°F where direct contact of the products of combustion with the work is not harmful nor is the oxidizing atmosphere undesirable, this method of heating offers many advantages. To list a few:

1. **Even distribution of heat throughout the oven and the work.** At temperatures this low where convection must be depended upon, direct firing by means of gas burners within the oven gives considerable trouble from this angle. Baffling of the normal upward flow of hot currents of flue products together with much care and experimentation in the location of flues is necessary and even then not always satisfactory. With an air heater, however, a large volume of gases, at the proper temperature, is pushed through the oven, sweeping every corner and insuring the even distribution desired.
2. **Rapid transfer of heat.** The large volume of hot gases travelling at high speed through the work by intimate contact and in accordance with the laws of heat transfer quickly give up their heat to the work.
3. **High efficiency.** Except for a small radiation loss from heater and ductwork, 100% of the heat generated is brought within the oven. If recirculation is used the stack loss is low and high efficiencies are the rule.
4. **Flexibility.** The same equipment, by minor adjustments of fan speed and gas input, serves over a wide range of temperatures with no sacrifice in evenness of distribution or efficiency.
5. **Safety.** All flame is confined to a special combustion chamber outside of the oven. There is but one burner, and safety controls are easily applied and positive.
6. **Easy application to existing or new ovens.** With an old oven


Double Shaft Motor
Drives both blower and fan. Totally-enclosed, ball bearing type. Available for all common electrical specifications.
Adjustable Air Louvers
Regulate volume of air flow.
Ratio Valve
Proportions the gas and air. Single lever on this valve regulates heat input.
Premix Unit
The blower mixes the proportioned fuel and delivers it to the thermal element.
Improved Fan
Delivers volume of air under pressure.
Insulation
Mineral wool jacket minimizes radiation losses from heater.
Thermal Element
Providing high heat release with extreme short flame.
Gas Shut-Off
Gas Inlet
Gas under uniform pressure at a minimum of 3 to 4 oz.
Pilot Line
Connected to gas inlet as part of Air Heater unit assembly.
Air Louver Control Lever
Equipped with position indicator and quick-locking operating handle.
New Pilot
Designed as an integral part of the burner head.
Connection to Hot Air Duct
Standard 12" diameter.

Maxon Industrial Air Heater to supply continuous flow of constant temperature air under pressure for low temperature drying and baking operations.



Surface Combustion, Pull-through Type

the heater can be placed below, above or to one side as convenient. No modification of the oven is necessary other than the introduction of small ducts demanding little space and offering no interference with the movement of the work. With new ovens the designer can concern himself solely with building an oven to handle the work, leaving the application of heat as an after-thought easily taken care of when everything else is settled.

Many uses have been found for the air heater such as the baking of cores and moulds; supplying make-up air for spray booths; low temperature annealing or air-drawing; lithographing; the baking of japan; and drying of all kinds of materials from textiles to food products. The first such heater was designed and satisfactorily applied to a core oven 74 feet long by 19 feet high by 7 feet wide located in a Buffalo foundry manufacturing cast iron radiators. Two air heaters were located so as to fire into two firebrick tile ducts located below and running the length of the oven. Recirculation was used and a fuel consumption of .569 cubic feet of 900 Btu gas obtained per pound of cores, with a 2.48 steel to sand ratio. These first heaters, although crude, operated perfectly and were the forerunners of the successful units of today.

It is the automotive field, however, that has used the greatest number of air heaters. Tremendous quantities of gas are burned in these plants for the baking of finishes and supplying heated air to ventilating spray booths. An article in the September, 1935, issue of Industrial Gas describes one such installation with an output of 48,000,000 Btu's per hour and this is far from the largest. Since as a rule the direct-fired gas heater supplants an indirect-fired oil heater, the value to the industrial gas engineer of this equipment is obvious.

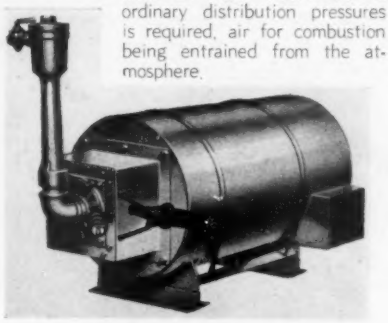
The direct-fired air heater is particularly adapted to drying (in a sense both core baking and japanning can be considered as drying operations as both call for the evaporating of binders or solvents) since the positive flow of air through the oven furnishes the vehicle necessary to carry the moisture out of the oven. With sufficient air heat would not be needed. The only reason for heating the air is to increase its carrying capacity per cubic foot. Burners lying in the bottom of an oven depending on natural draft for the removal of the hot gases furnish extremely poor drying. Air motion is slow. The air closest to the wet material becomes saturated and unless removed prevents further drying. But with an air heater a fan propels large volumes of air at high velocities thru the oven. All of the wet material is swept by unsaturated air and as the carrying capacity of the air is diminished it is in turn swept out of the oven.

In japanning and core baking the linseed oil requires fresh air for its oxidization, the process that converts it from the liquid to the solid state. With an air heater it receives an ample supply, further proof of their value for such applications. (Commercial core oils run about 50% linseed oil. Japan, fundamentally, is a black pigment called gilsonite, an asphalt, that goes into solution when cooked with a drying oil such as linseed or China oil. A reducer like turpentine or benzine is then added to reduce the viscosity for shipment. In the oven the drying oil and reducer are burned out or oxidized leaving the pigment as it appeared in the mine. 12.8 cubic feet of air are required to oxidize one pound of linseed oil.)

In japanning and other types of finishing the vapors given off in the early stages of the bake are flammable and sometimes explosive. It is absolutely necessary that these vapors be removed from the oven as quickly as possible and be diluted below their explosive limits. Here again the air heater performs valiant service both in removing the vapors and in diluting them with fresh air below the danger point.

Enough has been given to outline the place of the air heater in the industrial sun. Let us turn to its design. Neglecting for the moment the various controls and safety features usually added, we find that the design is not complicated. There is a burner, either of the atmospheric or pressure type, usually with a torch type nozzle, firing into a firebrick-lined combustion chamber. A fan either integral or separate located either before or after the heater serves to draw in the air and provide the force that sends the resultant mixture thru ductwork to the oven. If the fan is located before the heater it is called the "push-thru" type since it pushes the air thru the combustion chamber. If the fan is at the exit of the heater it is the "pull-thru" type. Each has its merits.

SC Atmospheric Direct Fired Air Heater for manufactured, natural or butane gas or mixtures of these fuels. Gas at ordinary distribution pressures is required, air for combustion being entrained from the atmosphere.



if high mixture temperatures are involved the push-thru is probably preferable altho this requires a greater pressure due to the back pressure of the heater itself. For the lower temperatures, in the japanning and drying ranges, the pull-thru is more common. A lower horsepower is necessary and where very large quantities of air are needed to reach very low temperatures (comparatively speaking,

below 200°F) a tee is located between the heater and the fan. The side opening of the tee is open to the atmosphere, controlled by a hand-set damper, and a good share of the air taken in at that point. This eliminates a suction in the heater that might harm combustion or pull out pilot flames. The pressure given the mixture by the fan is not as a rule very high, generally of the magnitude of 4" of water. With proper size ductwork and location of the unit close to the oven, this should be adequate.

The air used to dilute the products of combustion down to the desired temperature may be drawn from the room, from out-of-doors, or in a large part back from the oven itself. As will be shown later the use of recirculation effects a considerable economy and is highly desirable from that angle. Also a certain amount of heat is furnished by the combustion of the flammable vapors given off in japanning and other finishing bakes which helps to lower the gas consumption as well as definitely taking care of these somewhat dangerous vapors. The actual percentage of oven gases recirculated varies with the process and local conditions. Thus, for japanning the Underwriters permit a maximum of 85% but in view of their requirements of fresh air it is rare that this figure will be attained. On the other hand in drying the question of saturation of the air arises. There is no use recirculating so much of the air already loaded with moisture that it is unable to pick up more. In the 74 foot core oven described above it was found that only about 30% could be recirculated. If an attempt was made to increase this percentage the cores came out wet and condensation within the oven and stack was heavy. Where the drying temperature is very low it is questionable whether it is worth the added complication and may be omitted.

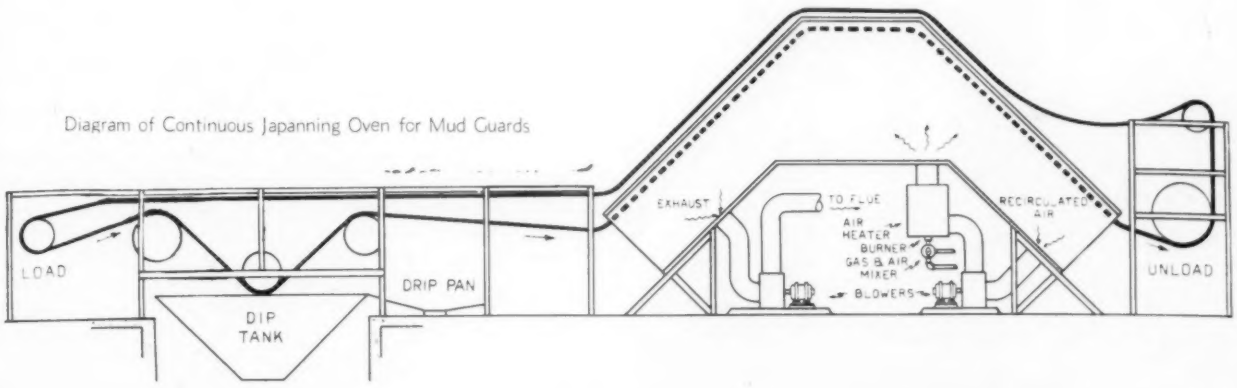
The temperature of the mixture furnished by the air heater can be regulated either through the gas or the air supply (the fan speed). Since cutting down the gas likewise decreases the heat units supplied and as the heat demand is more or less fixed it is generally better to change the fan speed. 900°F is usually taken as the top temperature for the heater of conventional design although with special equipment 1200°F is available.

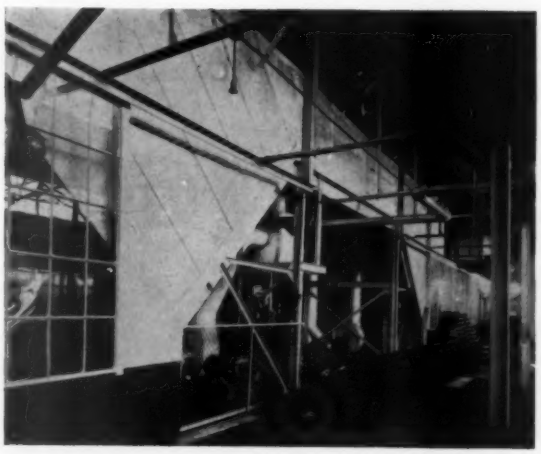
When the heater is to be used for drying or baking not involving flammable vapors the matter of controls is not complicated. A thermostatic pilot is incorporated as part of the burner and a solenoid or motor valve placed in the gas line controlled by a thermostat in the oven. Usually a flow switch is placed in the duct near the heater outlet tied into the electric valve in the gas line. Then, should the fan fail for any reason such as a belt breaking and the flow of air cease thru the heater, this flow switch would swing down, tilt a mercury tube and shut off the gas thus preventing damage to the heater or oven.

When, however, the heater is used on ovens with flammable vapors certain other precautions are rightly required by the Underwriters and must be provided. Thus, for ovens up to 350 cubic foot capacity a door switch is required. This device prevents lighting the gas with the oven door closed. With ovens over 350 cubic feet capacity a time-delay switch is necessary. Such a control acts so as to run the ventilating fans for a predetermined time before the gas can be ignited. Thus any possible accumulation of vapors is discharged from the oven and ductwork before any flame is introduced. The time of the delay depending on oven size and fan capacity will run from 10 to 15 minutes.

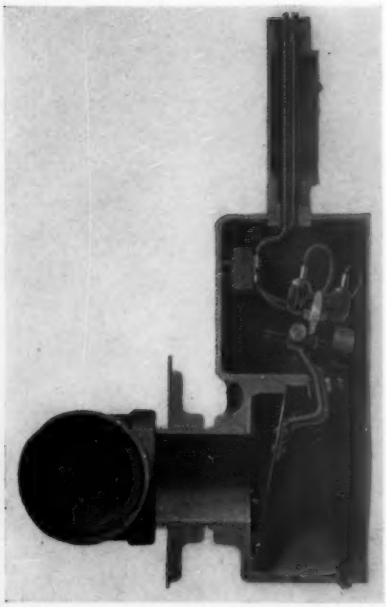
Besides all such safety controls of a mechanical nature, the Underwriters insist on certain ventilation standards for "Ovens for Japan, Enamel, and other Flammable Fin-

Diagram of Continuous Japanning Oven for Mud Guards





Continuous Japanning Oven for Auto Mud Guards



"Dry-Sys" air flow switch. Pressure type. Installed on exhaust side of fan, air pressure through duct pushes switch disc to closed position. When pressure stops, switch instantly returns to open position.

ishes." The following extracts from the Regulations of the National Board of Fire Underwriters covers this point.

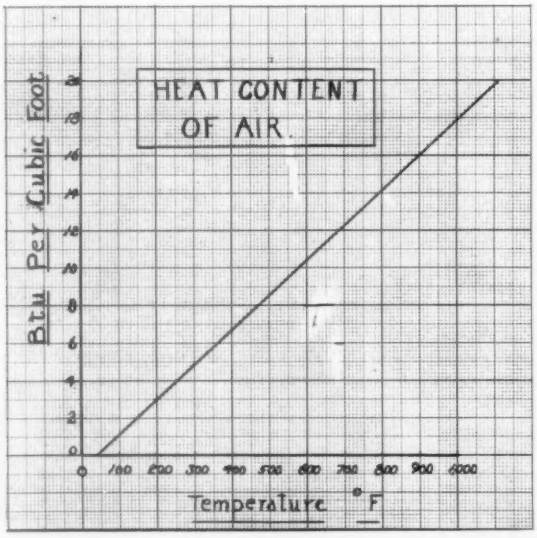
"It has been found that the lowest explosive limit of the vapors from the common solvents or thinners such as naphtha, benzine, gasolene, turpentine substitutes, etc., is about 1.0% to 1.4% vapor in air (by volume) at room temperature (70°F) or as an average one gallon of solvent evaporated in 2300 cubic feet of air.

"(a) To avoid an explosive atmosphere in box-type ovens and maintain a reasonable factor of safety 4,600 cubic feet of air should be provided for each gallon of solvent evaporated based on an oven temperature of 70°F and increased in accordance with the actual oven temperature, rate of ventilation being proportional to rate of evaporation. As evaporation is often completed in the first 15 minutes in box-type ovens, this usually means that ventilation should be not less than 350 cubic feet per minute per gallon solvent, per oven charge.

"(b) In continuous conveyor type ovens, as air drawn in at the discharge end does not appreciably reduce the vapor concentration at the point where the greatest evaporation takes place, about 9,000 cubic feet of air is necessary per gallon of solvent evaporated based on a temperature of 70°F and increased in accordance with the actual oven temperature, rate of ventilation being proportional to rate of evaporation.

"(c) Unless data are available on the actual surface covered per gallon of japan, lacquer, etc., as used, coverage should be figured at not over 300 square feet of surface per gallon of finishing material. Paints contain about 60% solvent, lacquers about 75% solvent."

The equipment manufacturers having direct-fired air heaters are familiar with these rules and will supply proper controls. Since blueprints must be submitted to the Inspection Department of the insurance company involved, it is well that the industrial engineer be acquainted with these regulations and the nature of the devices used to meet them. It may be his duty to explain their operation to the insurance company's inspector and satisfy him as to their fitness.



Calculations

In a previous article (American Gas Journal, May, 1938) the method of estimating the gas requirements for a furnace or oven was given where the heating medium consisted of the hot products of combustion either free of excess air or at the most diluted by but nominal quantities of air. In air heater work, however, the medium is hot air and the calculations while basically the same call for an extra step or two.

Large quantities of air are taken at room temperature and first raised to some temperature above that desired in the oven. As this hot air passes thru the oven and the work located therein the theory is that this extra heat is absorbed by the work and oven walls, the air being cooled to the desired oven temperature and then discharged to the atmosphere or, in part, recirculated. It is quite obvious in view of the tremendous quantities of air utilized that a large percentage of the heat furnished by the gas is locked up in the air discharged from the oven and hence the value of recirculation.

To illustrate this point, consider the following:—We will assume a japanning oven operating at 450°F. Then, by rule of thumb, we assume the air entering the oven has been raised to 600°F in the air heater by direct mixture with the products of combustion. (It is customary to figure a 150°F excess in temperature over that desired for the entering air.) At 600°F the air contains 10.15 Btu per cubic foot and at 450°F, 7.35 Btu above that at 70°F. Then in the oven, 2.8 Btu's are made available for every cubic foot of air that enters. If recirculation is not used 7.35 Btu's will be carried out of the oven and lost for every cubic foot of air supplied, or 72.5% of the total, an apparent contradiction of my previous statement as to the efficiency of air heaters. (Once again I fail to agree with the commonly accepted method of figuring efficiency, namely output divided by input. The true measure of one's skill in using what he has would be output divided by *available* input.)

If, however, recirculation is used this air leaving the oven is returned to the heater at some temperature below 450°F, the exact temperature depending on the distance from the oven to heater and the insulation of the duct work. Let us say in this case it is 300°F. At this tem-

perature it contains 4.7 Btu per cubic foot. Then in the heater it is only necessary to add 10.15—4.7 =5.45 Btu instead of 10.15, or a saving of nearly 50%. The loss becomes 2.65 Btu per cubic foot, or but 48.7% as against 72.5% of the total. These figures have assumed 100% recirculation but as stated above the Underwriters permit a maximum of but 85% in a japanning oven so the actual saving with recirculation will be somewhat less but still a most substantial one and worthy of the little extra complication it introduces in the original design.

Typical Example

Case 1. **Batch Type Japanning Oven**

Data:—Oven—15′ 6″ × 8′ × 8′ 3″ high.
Walls—4″ rockwool panels.
Work—5,000 lbs. per 8 hour day. Misc. small auto parts, app. 20 gauge.
Temperature—410° F.

Calculations:—

A. Radiation loss:—$636 \times \frac{410 - 60}{4}$ = 55,650

(636 equals wall area in square feet. A good rule of thumb is to figure the heat transfer thru rockwool panels as 1 Btu./sq. ft./hr./° F. temperature difference between oven and room/inch rockwool. This gives a generous factor of safety to allow for thru metal, door losses, etc.)

B. Work:—5,000 ÷ 8 = 625 × 410 — 60 × .125 = 27,400

C. Racks:—Assume weight equals work = 27,400

Total = 110,450 Btu./hr.

D. Ventilation:—625 ÷ 1.5 = 416 sq. ft. work (1.5 is weight per square foot of 20 gauge steel)

$\frac{416 \times 2}{300}$ = 2.78 gallons of japan.

(Times 2 for two sides. 300 is estimated coverage of japan in sq. ft./gal.)

2.78 × .6 × 350 = 583 CFM = required ventilation.

(Japan is estimated as 60% solvent, and Underwriters require 350 CFM air for batch type ovens per gallon of solvent per oven charge)

583 × 60 = 34,980 cubic feet/hr. 34,980 × 6.8 = 238,000 Btu./hr.

Grand Total = 348,000 Btu./hr.

(6.8 is heat content of air at 410° F.)

E. Circulation Necessary:—

Air enters at 410° + 150 = 560°. Content 9.6 Btu./cf.

Air leaves oven at 410° Content 6.8 Btu./cf.

Heat available in oven 2.8 Btu./cf.

$\frac{110,450}{2.8 \times 60}$ = 658 CFM required.

This is greater than the quantity needed for ventilation (583 CFM) and means either some recirculation is necessary or that the entering air temperature must be higher than figured. The most economical solution will be to operate the oven during the fuming period (the first 15 to 20 minutes) non-recirculating using an exhaust fan to sweep out the oven. At the end of that period recirculate $\frac{658 - 583}{658}$ or about 12%. (Note, how fresh air requirements have reduced the amount of recirculation. This particular case represents a heavy japan charge for the oven size. Normally a much greater recirculation would be possible.)

F. Burner Capacity:—

658 × 60 × 9.6 = 379,000 Btu.

(The air heater must handle 658 CFM which at 560° F. takes 9.6 Btu./cubic foot)

$\frac{379,000}{740}$ = 512 cubic feet of 900 Btu. gas per hour.

(740 is available heat of 900 Btu. mixed gas at 410° F.)

Therefore, the air heater must have an input rating of 512 × 900 = 460,800 Btu. an hour.

(Recirculation as shown would reduce this to about 358,000 Btu., a rather small saving in this particular case.)

Gas Immersion Steam Boiler

Gas fuel helps make unit flexible and automatic—horizontal position eliminates tube corrosion

By

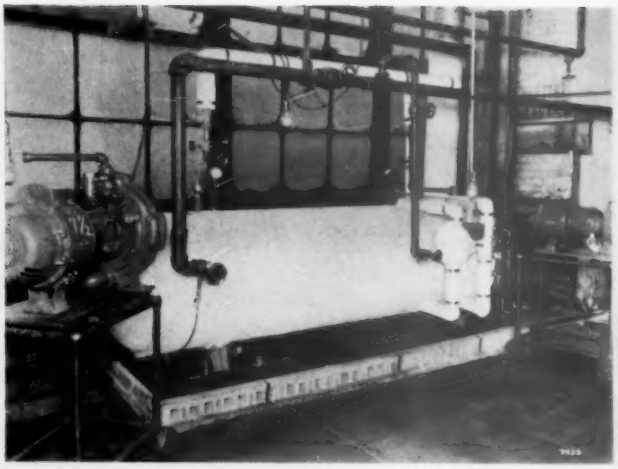
J. B. Nealey

American Gas Association

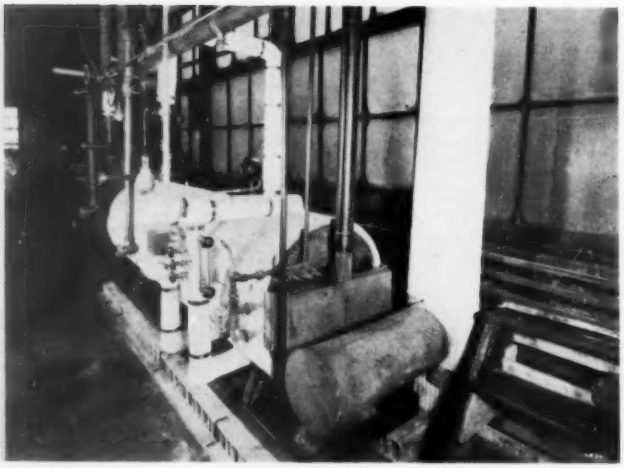
A NEW type of gas boiler designed to eliminate the old trouble of tube failure due to corrosion has recently been put on the market. It is an immersion horizontal fire tube type gas boiler and is automatic and continuous in operation. Due to the fact that it lies in a horizontal position the tubes are under water for their entire length. In other words, there are not tubes as in the vertical type boiler where corrosive action can take place at the water line. The firing of the boiler employs the gas immersion heater principle and it is designed for both high and low steam pressures. Its use is especially suited to hard water territories. It is very flexible because it is fired with the easily controlled and economical fuel gas.

An installation was recently made in the plant of the Moon Manufacturing Co., Chicago, makers of steam turbine-electric generators. This new type gas immersion boiler is used for block testing and running in these turbo-generator sets. This particular boiler is a 20-horsepower unit and the steam is used at 100 to 125 lbs. pressure. It is 30 in. in diameter and 8 ft. long and is said to raise 100 lbs. of steam pressure from cold in 12 to 15 minutes.

Heat is supplied through a series of tubes making two complete passes each and giving a total of 14 ft. of flue gas travel each. In this design the tubes are below the water level and therefore out of the region of corrosion. An 8 inch space is left between the bottom of the boiler and the lowest tubes for sediment collection. As this sediment is never heated directly it does not form the usual scale and cake and is easily removed by blow-down methods.



The horizontal position of this gas steam boiler eliminates the water level around the tubes and troubles arising from corrosion. This also provides a larger steaming area and quicker steaming when heating up. Note the turbo generator set at left ready for block testing.



Gas immersion steam boiler of the horizontal fire tube type, showing the firing end. The gas burners fire directly into the tubes and the whole is automatic and continuous in operation, requiring no attendance whatever.

Gas Burners Fire Directly Into Tubes

Firing is accomplished by a battery of specially constructed immersion gas burners, each of which fires into the end of one tube. The first pass of the tubes is in the upper portion of the boiler and the return in the lower. As the hottest portion of these tubes is just below the water level, steam is generated very quickly while the water in the bottom is receiving a quick preheat from the waste products of combustion, going through the second pass of the tubes. The gas immersion heater principle employed has been used for years to heat water in open top tanks and is recognized by engineers as being practical and efficient.

The low water line permits direct return of condensate when the boiler is installed along side of the appliance which eliminates the need for traps and pumps. An ample steam liberation surface is inherent with this design and this eliminates surging and throwing of water into the steam chamber. The gas burners used are of a special design to give a long needle shape flame which reaches back into the boiler tubes. A blower is employed to supply air for combustion which gives positive control over the gas-air mixture at the burners at all times.

Automatic In All Details

This boiler is automatic in all details and needs no attention whatever. An automatic steam pressure control, low water fuel cut off and safety pilot are part of the equipment. As soon as the pressure set on the indicator is reached an electric contact is broken and this stops both the blower and operates a solenoid which closes a valve in the gas supply line to the burners. The automatic safety pilot operates also to cut off the gas supply in the event of pilot flame failure. When steam is again needed the blower starts up, the gas valve opens and the pilot ignites the gas burners, always in this sequence. With this setup steam is said to leave the heater at 338 deg. F. while the flue gases in the stack are only 350 deg. F. The manufacturer guarantees a combustion efficiency of 80% at 100 lbs. steam pressure.

W. R. Teller Succeeds W. M. Couzens in A. G. A. Laboratories

W. M. Couzens, Research Engineer of the American Gas Association Testing Laboratories has announced his resignation from the Laboratories, effective July 1st. He has become associated with Gaffers and Sattler in Los Angeles, an organization well known in the industry and one of the largest producers of gas appliances on the Pacific Coast.

Mr. Couzens' duties as Research Engineer will be taken over by W. R. Teller who has been Assistant Research Engineer for several years. Mr. Teller, a graduate in Mechanical Engineering from Case School of Applied Science, joined the Laboratories in 1930. During the past eight years he has had experience in every department of the Laboratories, including testing, field inspections and requirements committee activities. Through his experience and contact with mixed gas research work, he has become an authority on the technical aspects of gas mixing and has assisted several member utility companies in the solution of their problems along this line.

October A.G.A. Convention Will Rally Around Theme "Gas Marches On"

The Twentieth Annual Convention of the American Gas Association will be held in Atlantic City, New Jersey, the week of October 10th, the general theme of the meeting being "Gas Marches On."

George F. Mitchell, President, The Peoples Gas Light and Coke Company, Chicago, is Chairman of the committee in charge of the program for General Sessions. Mr. Mitchell and his associates on the committee have decided that all speakers on General Sessions should be from without the gas industry. This departure, he believes, will be popularly received by the delegates.

Suggested speakers and topics are now being considered by Mr. Mitchell's committee. It is certain that among the subjects to be presented by persons who occupy positions of authority in American industry will be research, national resources, advertising and regulation. The program will be interspersed with other addresses covering subjects of outstanding current interest to the industry.

The opening day of the Convention, Monday, October 10, will be devoted in the main to committee meetings and business sessions of special interest to the members of the natural gas industry. The General Sessions will be on Tuesday, Wednesday and Thursday mornings. Sectional meetings will be scheduled, as usual, in the afternoons. The Technical and Industrial Gas Sections will have three meetings, while the Accounting and Commercial Sections will have two. The Home Service women will repeat their Breakfast Conference. In addition, there will be several luncheon conferences staged in connection with sectional meetings.

General Sessions will be held in Atlantic City's Auditorium, familiar for several years to a large number of gas industry men and women. Sectional meetings will be held in the hotels.

The Odorization of Natural Gas

By

E. R. Weaver

National Bureau of Standards

1. Introduction

THIS paper is a summary of what seems to be most important in numerous printed articles, which are listed, with some that were not immediately available to the writer, at the end of the paper. With information from published material has been combined that from the answers to questionnaires, sent to all State Commissions without regard to whether they have authority over gas companies, and information solicited from a considerable number of individuals who have been most generous and helpful in their response.

2. Development of Suitable Odorants

The addition to fuel gas of a material possessing a strong odor for the purpose of disclosing leakage and preventing accidents appears to have been first proposed in Germany about 1880. The occasion was the rapid development of the water-gas and producer-gas processes for manufacturing gas, both for industrial use and for general distribution. Because of their high content of carbon monoxide, both water gas and producer gas are much more toxic than the then familiar coal gas; and they have much less odor. Their use accordingly increased the hazard of asphyxiation, which, with the mechanical construction employed at the time and the general use of gas for lighting in every room of the house, was considerable even with coal gas. Several investigations were made of suitable odorants during the next thirty years, and local laws requiring odorization were passed in some places.

Among the odorants used in Germany were ethyl mercaptan, one of the three now most used in American practice, and a condensate obtained in the production of Pintsch gas, which is of the same general character as Calodorant, the most widely used of present odorants.

In 1918 the Chemical Warfare Service began odorizing water-gas in its plant at Edgewood with butyl mercaptan, a near relative of amyl mercaptan, which is second among the substances now used as odorants. This was the first use in this country of an odorant for indicating leakage of fuel gas of which a record has been found.

In 1919 W. H. Fulweiler used several odorants, including amyl mercaptan, on rather a large scale in attempting to locate underground leaks in Kansas City, but with indifferent success. In the same year, Katz and Allison of the Bureau of Mines began the investigation of the use of odorants in connection with public gas supplies. In their paper entitled "Stenches for detecting leakage of blue water gas and natural gas", these investigators anticipated current practice in several respects. However, interest in the use of odorants for this purpose lagged for approximately another ten years, when the widespread replacement of manufactured gas with nearly odorless natural gas again brought the subject to the fore.

Investigations of suitable odorants and methods of employing them were undertaken almost simultaneously by a Committee of the Pacific Coast Gas Association and by the Bureau of Mines working in cooperation with the American Gas Association. The study on the Pacific Coast resulted in the development of methods of manufacturing and applying "Calodorant", an inexpensive product of oil refining, which was almost at once adopted for the odorization of nearly all natural gas distributed in California and has become probably the most widely used odorant in other parts of the country. The investigation by the Bureau of Mines covered very completely the conditions to be met in successful odorization and the properties of a wide variety of chemical substances at first considered to be possibly useful odorants. Most of these were eliminated during the investigation for good reasons. Several others were found suitable except for cost or lack of commercial availability, barriers which may disappear with the development of the chemical industries. The only one recommended which is now used was ethyl mercaptan; but the monograph on the subject still remains the outstanding textbook on the selection and use of odorants. Of particular importance are the records of field trials which demonstrated the possibilities and difficulties of odorization in practice.

3. Purpose of Odorization and Properties Required of an Odorant

The use of an odorant is, of course, always for the purpose of detecting leakage. However, a distinction should be made between the continuous maintenance of a moderately strong odor which will make possible the prompt detection of any significant leakage in the household, and the temporary use of a much stronger odor when a survey is being made of the underground distribution system. Although the first use of stenches during leakage surveys was not considered particularly successful, later trials gave better results, and the information now available indicates that temporary odorization is considered throughout the gas industry to be one of the most effective tools in maintaining tight mains and services. It has been employed by companies which distribute manufactured as as well as by natural gas companies which have never attempted to odorize the gas continuously.

The properties of a desirable odorant have been summarized frequently. From several summaries the following list has been prepared.

1. The odorant must be physiologically harmless in any concentration likely to be encountered.

Paper presented at Meeting of State Public Utility Commission Engineers, May 17-19, 1938.

2. It must not irritate eyes or mucous membranes.
3. It must not be nauseating.
4. The odor should be unpleasant.
5. It must be sufficiently different from other odors apt to be encountered to be easily identified in the smallest concentration likely to be detected.
6. The odor should be similar to that of familiar fuel gases.
7. The products of combustion should be harmless, and non-corrosive and without odor if possible.
8. The vapor must be sufficiently insoluble in water or drip liquids to pass readily through the distributing system.
9. It must not react with common metals, the oiled leather diaphragms of meters, nor too readily with rubber gaskets.
10. It must not react at ordinary temperature with any probable constituent of the gas, including oxygen and hydrogen sulphide.
11. The concentrated odorant should be a liquid, a small volume of which will odorize a very large volume of gas.
12. The liquid should boil within a reasonably narrow range and be sufficiently volatile to permit the introduction of enough odorant into a small fraction of the total gas stream at low temperature and at high pressure.
13. The vapor should be as little adsorbed by soil and by household materials as possible so that the odor from leaks will be noticeable promptly and will not persist after a leak has been stopped.
14. It should be cheap.
15. It should be conveniently available in sufficient quantity.

The purposes of most of these requirements are so nearly self-evident as to require no comment. The requirement that the odor be similar to that of manufactured gases may have been overemphasized. The odor of gas will be quickly learned by every user—the first time the range is used if automatic ignition is depended on, which it probably will be if the range was manufactured within the last five years. The requirement is a useful one, however, primarily because much assistance is given to the gas company through the reporting of street leaks by the general public, and unless an outdoor odor is immediately recognized by everyone as that of gas, help of this kind will probably not be received.

The high ratio of volume of gas to volume of odorant is desirable because it reduces the cost of transportation and the size of odorant-containers, but if the volume of liquid odorant to be introduced is too small its control is difficult. Such odorants as ethyl mercaptan are sometimes dissolved in gasoline to avoid this extreme. The property of going into solution or being adsorbed in the mains is not wholly undesirable either, for it minimizes fluctuation of the strength of odor if the operation of the equipment for introducing it is irregular.

4. The Detection of Underground Leaks

The gas from an underground leak may spread widely before reaching the surface of the soil, where it is rapidly diluted and may be swept away by the wind. Even more troublesome is the fact that most of the materials which impart odor to gas are strongly adsorbed by some soils. The certain detection of underground leakage during a brief survey, therefore, requires the use of an odor so strong that the small amount of gas which escapes during the lighting of burners or through leaks in piping too small to be detected with soapsuds annoys or needlessly alarms domestic customers. It seems to have been the common experience of gas companies that the first introduction of a strong odorant caused a flood of complaints which it was difficult to attend to promptly enough to avoid dissatisfaction. This is probably the reason for the neglect of odorization for detecting street leaks for so long a time after the first attempts to use it for this purpose. During the past eight or ten years, however, it has been found that the difficulty can be overcome in one or more of the following ways.

(a) By beginning with a small amount of odorant and increasing it only at a rate which will permit the distribution and complaint departments to keep up with the demands upon them.

(b) By introducing odorant into a portion of the system at a time and doing all that needs to be done, indoors and out, before transferring operations to another locality.

(c) By notifying customers in advance that the survey is to be made, telling them that they may expect to detect odors from the escape of insignificant amounts of gas, and advising them to have repairs made by their plumbers when needed.

(d) By odorizing the gas only to the extent desirable to call attention to significant household leakage and to continue the program for a sufficient time to saturate the soil about leaking mains and services with odorant and to obtain reports, under favorable conditions of weather, from all parts of the system. It is obvious, of course, that leakage will be most easily detected when the air is still and warmer than the earth below it. This condition occurs principally during the last hours of the night, which is accordingly the best time for locating leaks.

Nearly everyone who has tried odorization for detecting street leaks seems to agree that it is the most economical method available for the purpose. There is one account of an effort to detect the location of a leak in a natural gas line wasting forty thousand cubic feet a day. Inspectors walked over the leak three times without finding it. It was located immediately when an odorant was introduced. One of the best accounts we have of a leakage survey is of that made by the Cincinnati Company in cooperation with the Bureau of Mines. After this survey, it was computed that the location of leaks in the portion of the system owned by the Company had cost 77 cents per leak. Previously the location of leaks by other methods had cost $23.80 per leak.

5. Continuous Odorization

Probably nearly half of the natural gas and substantially all of the propane and butane now distributed for domestic use are odorized. The writer's information on the subject is incomplete, but from what is available it appears that all the natural gas except that delivered to large industrial customers on direct transmission lines is continuously odorized in Alabama, California, Georgia, Illinois, Iowa, North Dakota, Texas, Utah, and Wyoming. Nearly all natural gas is odorized in Colorado and Michigan. Eighteen of 43 companies in New York odorize the gas. Odorization is known to be extensively employed in Arkansas, Louisiana and Nebraska, but information is incomplete.

It is likewise incomplete for Indiana, Kentucky, Missouri, Mississippi, and Tennessee. So far as could be learned, continuous odorization is practiced by no one in Kansas, Montana, Ohio, Oklahoma, West Virginia, or Washington, and by only one company in Pennsylvania. In the states not mentioned no natural gas is used, or distribution is by only one or two companies in each, and their practice is not known.

Odorization of natural gas is required by law in Texas, and that of propane and butane in Mississippi.

In Illinois, a law which requires natural gas supplied to "any school or public building" to be odorized probably has the effect of compelling the odorization of all gas distributed to the general public. In Utah and the cities of Michigan subject to the jurisdiction of the Public Utilities Commission of that State, odorization is required by order of the Commissions. In all other places odorization has been adopted voluntarily by the gas companies. In Illinois practically all gas companies were practicing it before they were required by law to do so.

To the writer's knowledge, no one who has had first-hand experience with continuous odorization has published an unfavorable opinion of the results. Favorable opinions abound, a few of which, chosen for variety or conciseness rather than enthusiasm, are quoted below.

1. "According to the present practice in the Southwest, Calodorant and Pentalarm are costing less than $1 per million cu. ft. of gas treated. This cost can be justified by the protection which it affords to life and property as a warning agent, preventing serious fires and explosions from the ignition of escaping unburned gas. Aside from the protection which it affords customers, odorization is of distinct benefit to the company in a financial way through the elimination of damage costs and lawsuits resulting from explosions and accidents which might occur if escaping gas were not so easily detected. Leaking house lines are usually discovered and the leaks are often repaired before enough gas has escaped to cause a serious high bill complaint, resulting in better customer relations. Odorization has been an important factor in helping sell natural gas as a safe and economical fuel. The fact that a warning agent is present in the gas is of considerable importance to the customer who might otherwise have fears regarding the safety of gas service."

2. "From our experience with odorants to date, we are very enthusiastic about the results attained. We do not expect to detect every small street leak at once by this odor, but consider ourselves very fortunate in finding the several noted above before they caused serious trouble. The indication of this odor, together with the persistent use of combustible gas detectors is in our opinion the best insurance any gas company can buy. They have proved of great value to us and coupled with our wholesome respect and fear of leaking gas have been the means of saving us thousands of dollars in damage claims."

3. "The companies distributing natural gas who are odorizing consider it a sound investment because it reduces unaccounted-for and is a safeguard against the dangers of employee and consumer liability, and greatly helps to maintain public confidence in gas as a safe fuel."

4. "The odorizing of natural gas to be used for domestic and industrial purposes is now recognized throughout the industry to be a very desirable safety precaution."

5. "Odorization has been found to accomplish all that was expected and has proven highly successful in all respects."

6. "The cost of odorization is negligible when compared with the saving and increased safety it provides."

6. Odorants Now in Use

The odorants now most used in the United States are Calodorant, which is a complex mixture of organic substances about as volatile as gasoline, Pentalarm, which is principally amyl mercaptan, and ethyl mercaptan. For natural gas, Calodorant appears to be used exclusively in the Pacific Coast and Mountain States, and to predominate in the Eastern States. Pentalarm is used extensively in the Mississippi Valley and the Southwest and has been replacing Calodorant in this territory. Ethyl mercaptan appears to be used by very few natural-gas companies, but is used, probably more extensively than anything else, in the liquefied-petroleum-gas industry. Calodorant is also much used for propane and butane, especially on the Pacific Coast, and Pentalarm has entered the field. One company uses both Calodorant and Pentalarm under different conditions for reasons which are not clearly defined in the information available.

The reason given for the choice of odorant is usually that of economy. Other reasons for a preference which have been stated follow. Pentalarm is preferred to Calodorant because of the ease of introducing it. Calodorant is preferred to Pentalarm for the same reason. (Both choices are probably good depending on the equipment used.) Calodorant and Pentalarm are preferred to ethyl mercaptan because they smell more like manufactured gas. Pentalarm is preferred to Calodorant for the same reason. Calodorant has been replaced by Pentalarm because the odor of the latter is less likely to be mistaken for that coming from a near-by oil refinery. Pentalarm has been replaced by ethyl mercaptan for the same reason. Pentalarm is lost through oxidation during transmission. Ethyl mercaptan is preferred because its odor quickly disappears when a leak is repaired. Calodorant is favored because its retention by materials in the distributing system makes odorization continuous and not too variable even when the operation of the plant is briefly interrupted. Objection is made to Calodorant because it fractionates and consequently does not give uniform results in the simplest type of bypass odorizing equipment.

Calodorant is manufactured by the Standard Oil Company of California, San Francisco, and Pentalarm by the Sharples Solvents Corporation at Wyandotte, Mich. The Mallinckrodt Chemical Works, St. Louis, is the only known producer of ethyl mercaptan on a large scale. Kay-dectene, a material said to resemble Calodorant is manufactured by Kay-Fries Chemicals, Inc., 180 Madison Ave., New York City, and is used by at least one company. Its odor is said to depend on "unsaturated oxygenated hydrocarbons" rather than sulphur compounds. The only other odorant known to be in current use in this country is a mixture of "5 parts of forerunnings of benzol and 1 part of Calodorant" and is used by one company.

7. Amount of Odorant Used and Its Cost

The Texas law requires that the odorant shall "indicate by distinctive odor the presence of gas when such gas is present (mixed with air) in concentrations of not greater than one per cent by volume". This is approximately one fourth of the lower flammable limit of natural gas. In interpreting the Illinois law the Commerce Commission has tentatively ordered that the gas "shall have sufficient odor at the point of ultimate consumption to be detected—when the concentration of gas in air is not over two per cent by volume". The rules of the National Fire Protection Association require the odorant in liquefied petroleum gas to "positively indicate the presence of gas down to concentrations in air of not over one-fifth the lower limit of flammability". Actually the information available indicates that gas is more strongly odorized in Illinois than in Texas, although only half as much odorant is called for by the rules.

The strength of the odor is usually determined by admitting a measured volume of gas to a room, mixing it with a fan, and admitting a number of observers. Usually the observers agree that they can detect an amount of gas as small as one tenth of the amount usually introduced in compliance with the Texas or N.F.P.A. rules; but it is improbable that they would notice so small an amount if the gas accumulated gradually and they were not expecting it. Hence, the apparently large factor of safety

is probably illusory.

The amounts of Calodorant used in natural gas range from 1¾ to 4 gallons per million cubic feet, with 2 gallons appearing to be most frequently employed. The use of 3 gallons is not uncommon. In one case, 18 gallons per million cubic feet is used in a mixture of blue water gas and natural gas which, judging from its heating value, probably contains about thirty per cent of carbon monoxide. Assuming that this is the case, the odorant gives about the same factor of safety against a possibly fatal concentration of carbon monoxide that 2½ gallons per million cubic feet of natural gas would give against a flammable mixture.

The amounts of Pentalarm used by natural-gas companies range from ¾ to 3 pounds per million cubic feet. The only available figure on the quantity of ethyl mercaptan used in natural gas is about one pound per million cubic feet.

One of the largest producers of liquefied petroleum gases uses 1.3 pounds of ethyl mercaptan per ten thousand gallons of propane, which is about 20 per cent more odorant per Btu of heating value than the figure stated for natural gas. Another large company uses 2.6 gallons of Calodorant or 1.4 pounds of Pentalarm per ten thousand gallons of butane. These are equivalent to about 2.4 gallons of Calodorant and 1.3 pounds of Pentalarm in a million cubic feet of average natural gas and are near the probable average of the quantities commonly used in natural gas.

The current price of Calodorant at the refinery in California is 28.5 cents per gallon in tank cars and 30.5 cents per gallon in returnable drums. Transportation increases the cost to 38 cents and 48 cents per gallon in Chicago. The manufacturer of Pentalarm did not quote a price, but from the total cost at the plant of one large midwest company during the past fifteen months it is found to have averaged 77 cents per pound. The Mallinckrodt Chemical Works quotes $1.30 per pound for ethyl mercaptan in drums which are not to be returned.

8. Introduction of Odorants Into the Gas

Equipment for introducing odorants into the gas is extremely varied. The liquid may be simply dripped into the main through a needle-valve and sight-glass and controlled manually by the rate of dropping; it may as simply be vaporized from a wick in the gas stream; or it may be introduced and vaporized by elaborate power-driven equipment designed to proportion it accurately to the measured quantity of gas. Two or more companies specialize in the manufacture of equipment for the purpose, but many gas companies prefer to make their own, frequently from salvaged material. A description of the ingenious ways that have been devised to proportion the quantity of odor to the gas in spite of variable rates of flow, variable static pressure, variable temperature and variable composition of the odorant caused by fractionation, would be interesting but long; and excellent accounts are available in the gas journals for those concerned.

Two papers, by Henderson and by Briscoe and Caldon, have appeared within the last two months, each of which illustrate with simple drawings and discusses a variety of types of odorizing equipment.

The cost of odorizing equipment is not a large item, and everyone agrees that the labor required for its operation is negligible. The table below, showing costs of odorizing equipment, includes actual costs of certain installations reported by two State Commissions and one gas company, and the factory prices currently estimated by one manufacturer. Some of the data were given in terms of capacity per winter day; others in capacity per hour. The latter have been arbitrarily multiplied by 20.

9. Cost of Equipment for Introducing Odorizing Agent

Capacity M. cu. ft. per day	*Type*	*Cost installed*
Domestic	Pot with wick	$ 5
Domestic	By-pass	10 a
25	Pot with wick	10
200	Orifice disc sight feed	175
200	Automatic proportional	150 a
300	Orifice disc	300
500	Homemade, hand regulated	40
1,500	Orifice disc	415
2,000	Differential pressure, sight-feed	66
2,400	Orifice disc	500
7,000	Orifice disc	1,000
10,000	Removable spray	500
10,000	Orifice disc	1,000
10,000	Proportional injection	1,010
10,000	Nozzle in venturi tube	1,243
10,000	Nozzle in venturi tube	4,486

a. Not installed.

From this table it appears that the cost of equipment will roughly be no more than one dollar per ten thousand cubic feet of daily capacity. The equipment need not be designed to have the capacity of the absolute-peak day, but only for conditions which occur frequently. Assuming that a maximum daily sendout five times that of the annual average will be high enough for design purposes and allowing annual charges of 20 per cent of the investment, a liberal estimate of such charges would be 30 cents per million cubic feet of annual sendout.

10. Conclusion

The information that has been collected leads to a group of questions rather than to a positive answer. It appears that in most localities enough odor to insure the detection of a mixture of gas with air well below the combustible limit can be added, as frequently stated, for "less than one dollar per million cubic feet" of natural gas, but not much less. How much of this cost can be credited to the detection of leaks that would have been detected at greater cost by other means? How much can be credited to gas saved by the detection and repair of leaks that would not have been detected otherwise? If the gas in its system is worth 15 cents per thousand cubic feet to the company, a reduction in unaccounted for gas of 0.6 per cent of the output will approximately pay for odorizing. After these deductions have been made, is the residual cost worth while as a protection of life and property? The answer to the last question would be easier if we knew what fraction of the fires and explosions would be prevented by the easy detection of the gas by odor and whether the next explosion would be a minor affair or would resemble that in the Ohio State office building or the New London School. If the number of fires per million cubic feet of gas for which data were quoted is typical, and if the ratio of fires charged to one company to the total number on its system is also typical, odorization of all the gas at one dollar per million cubic feet would cost roughly 1300 dollars per fire.

❖

Erratum

In the June issue of the *Journal* on page 49 is abstract of a report,—"Flow Characteristics, Composition and Some Liquid Phase Properties of Hydrocarbon Fluids from a 'Combination' Well."

Through an oversight the following footnote was omitted.

[1] Summary and Conclusions reprinted from Bureau of Mines Report of Investigations 3402.

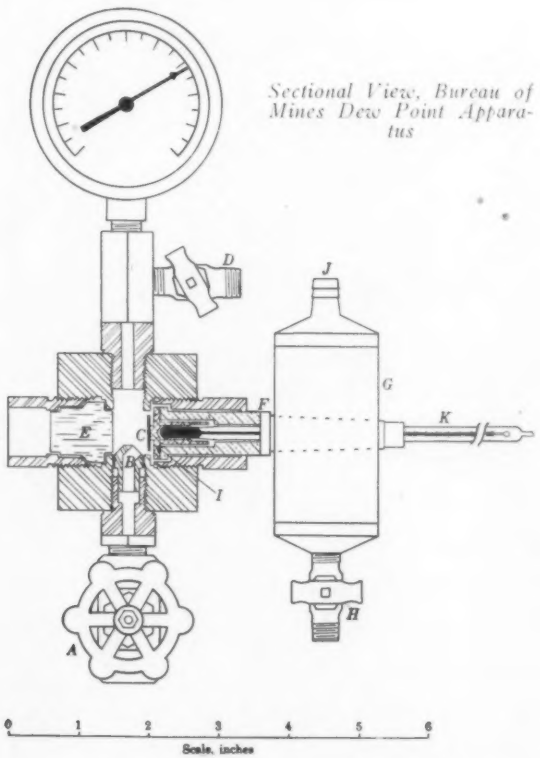
[2] Associate physical chemist, Bureau of Mines, Bartlesville, Okla.

[3] Natural-gas engineer, Bureau of Mines, Bartlesville, Okla.

Bureau of Mines Apparatus for Determining the Dew Point of Gases Under Pressure

By W. M. Deaton[2] and E. M. Frost, Jr.[3]

The operation of the Bureau of Mines dew-point apparatus involves (1) cooling of a polished mirror surface, which is in contact with the flowing gas, to that temperature at which condensation begins, (2) direct visual observation of this condensate in the form of dew or frost on the mirror surface, and (3) observation of the temperature at which the deposit appears and disappears, as indicated by a thermometer. The unit was made principally of stainless steel to avoid corrosion by either



Sectional View, Bureau of Mines Dew Point Apparatus

condensed moisture or any corrosive gases that might be present. The apparatus is suitable for use at pressures up to 2,500 pounds per square inch, but is equally suitable for use at atmospheric pressure. It has withstood hydrostatic-pressure tests of 5,500 pounds per

(Continued on page 44)

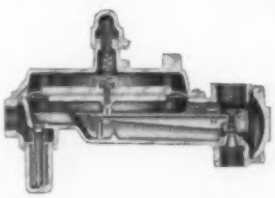
[1] *Abstracted from Bureau of Mines Report of Investigation 3399.*
[2] *Chemist, Bureau of Mines, Petroleum and Natural Gas Division, Amarillo, Tex.*
[3] *Associate chemist, Bureau of Mines, Petroleum and Natural Gas Division, Amarillo, Tex.*

RESULTS

...determine the record in Gas Control Performance

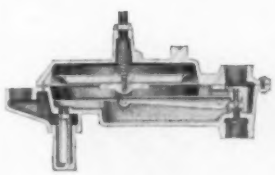
REYNOLDS has more than forty-five years of experience in the Gas Control Field, working out, designing, building, testing Gas Regulators and the result—Hundreds of thousands of Regulators in use throughout the world, meeting requirements and giving successful performance.

The Service Regulators featured are built to meet the specific requirements in service regulation. They are guaranteed to give the high quality of performance you demand, over years of operation, with a minimum upkeep. Below are a few characteristics of the different models.



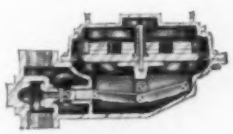
MODEL 10 — Dead Weight or Spring Type, with or without Mercury Seal. All working parts are so accessible as to be interchangeable without removal from pipe line. (Straight Lever Type.)

☆



MODEL 20 — Dead Weight or Spring Type, with or without Mercury Seal. All working parts are so accurate as to permit complete interchangeability in shop. (Straight Lever Type.)

☆



MODEL 30—For horizontal or vertical connection with removable valve pocket. Available with either Spring or Dead Weight adjustment. With or without Mercury Seal. (Toggle Lever Type.)

Any of the Models 10, 20, or 30 can be furnished with Dead Weight or combination Spring and Dead Weight Safety Seal if Mercury Seal is not desired.

REYNOLDS BRANCH OFFICES . . .
- Dwight Building, Kansas City, Mo.
- Second Unit, Santa Fe Building, Dallas, Texas

REPRESENTATIVES . . .
- Eastern Appliance Co., Boston, Mass.
- Wm. A. Ehlers, 49 S. Clinton Street, East Orange, N. J.

Reynolds Gas Regulator Company
Anderson, Indiana, U. S. A.

GAS CONTROL SINCE 1892

Robertshaw greets the C. P. Range and congratulates the Industry on its achievement in certified performance.

The full significance of perfection is understood by Robertshaw who, in turn, has worked towards constantly greater perfection in oven-heat-control.

The performance of Robertshaw Oven-Heat-Control is likewise certified—by its history of wide acceptance and national reputation. The perfection of Robertshaw Controls has made them worthy companions to the Industry's *finest* ranges.

ROBERTSHAW THERMOSTAT COMPANY Youngwood, Pa.

What Does the CP Range Mean To Gas Companies?

CP=Cooking Perfection; Mr. Houston Sounds the Rallying Call to This Improved Gas Appliance

By

Frank M. Houston

Rochester Gas & Electric Co.

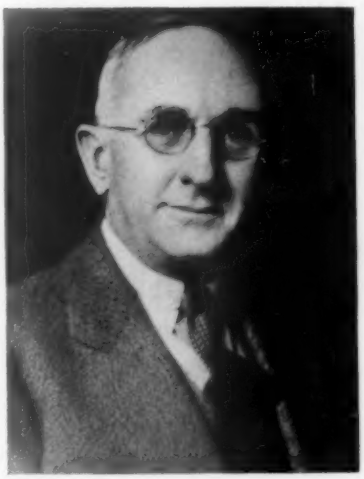
NO ONE can deny that the gas range and gas cookery is the keystone of our rate arch and the backbone of your business. If we lost that cooking load to competition next would come a flood of off peak rates for electric water heating and the loss of our water heating load would follow.

In spite of having gained 1,500,000 new cooking customers, we are losing our domestic *load* fast! Since 1930 the manufactured Gas Industry has lost nearly 20% of its domestic load, exclusive of house heating, and in the same period the natural gas industry has lost over 10% of its domestic load, exclusive of house heating. This fact is easily shown by statistics on the manufactured gas industry and if you in the Natural Gas Industry don't believe you are losing out about as fast, compare your domestic sales of gas for the three summer months at the period of the year when you are selling no house heating with the same period over the last six years and see how you too are rapidly becoming faced with a crisis.

The reason for this is that in the past the gas range has suffered competitively because it couldn't claim anything new or revolutionary. The modern range is a highly perfected appliance, but it has had a little trouble escaping the dingy association described as "the old gas works days." On the other hand, all of us, since our early school years have been taught that electricity is the miracle-working marvel of the age. Just the fact that electric cooking is a newer development than gas cooking carries the implication that it is an improvement, that it is better and that gas cookery is obsolete.

An Exciting Development

Now, with the C P range, *we* have the advantage. *We* have the newest development in the home cooking field. And *we* have an exciting and convincing sales story to tell. With the new C P ranges we can set up before the housewife standards of cooking performance and convenience and economy which are the newest and latest, and higher than



FRANK M. HOUSTON

anything ever before attempted by any fuel—and *guarantee* to deliver them. *So—to the gas companies the C P Range offers the most modern, latest developments in cooking equipment.*

Therefore, for the first time since the development of the electric range we have something which is even more modern. For the first time it *puts the gas companies on the offense rather than the defense.* Everyone knows that a good offense is better than the best defense. It is easier, less expensive and more resultful a way to fight a good battle. No longer need we say "me too" in defending our cooking service against competitive claims.

In addition to the range itself, there are other facts which will send the sales curve skyward. One is that in this new program the advertising and promotional efforts of the individual manufacturers, in national and local advertising, and utilities in national and local advertising, will be unified so as to build up to much greater effectiveness their consumer appeal. *Therefore, it unites our industry for a common cause.* Everyone knows that in unity there is strength. Our combined efforts will overshadow and overthrow the efforts of all competition.

Something to Talk About

Another factor is increased publicity for gas cookery. There are two kinds of publicity. That which is spontaneous, which arises without any effort or activity on the part of the recipient; and that which is carefully, skillfully created. And for both, the C P Range is a "natural." It is real *news*—and consequently will get much spontaneous notice in all classes of publications, as well as by word-of-mouth. And, as for created publicity, the doors of the magazines and newspapers will open wide to receive our prepared publicity stories.

The C P Program *will speed up the replacement of all old ranges.* More and more housewives will come to realize the great strides that gas cookery has made. And they will see how the C P Range pays for itself out of savings in fuel and food. Finally they are going to see more and more new gas ranges dressing up their neighbor's kitchens. So, out go the old stoves.

But there are still more reasons why gas utilities should promote C P Ranges.

This new program and this new

range, because they are the perfect answer to a long-felt need, are bound to arouse a tremendous amount of enthusiasm in all levels of the industry and *greatly increase industry morale.* Everyone along the line, from the engineer to the neighborhood salesman, from manufacturer to dealer, is going to be keyed up and filled with new enthusiasm. This will inevitably be reflected in increased sales.

But the C P Program means more than just increased sales—it also *means improved standards for all gas ranges.* This will be accomplished in three ways: (1) Directly through the raised specifications which ranges must meet to earn the C P seal. (2) Indirectly, as C P range competition forces other individual manufacturers to improve their specifications, in order to retain and if possible, increase their share of total sales. (3) (Also indirectly) Because people will be stimulated to buy somewhat more expensive models than otherwise, even those who are not in the C P Class.

This program, because it *will raise the average unit sale price and dollar volume of gas ranges,* will result in increased revenues for the new business departments of gas utilities, a good which needs no explaining.

Invites Dealer Cooperation

Another reason why C P ranges are a boon to our industry is that here is a standard of range construction which *offers a basis for Department store and dealer cooperation.* Many times utility executives have said, "I know I should cooperate more with dealers, but I'm afraid they will sell too low a quality of merchandise." Of course, the sale of cheap ranges is of little value to you in properly interpreting your fuel and should not be encouraged. But—here is a product of 22 points of superiority which you know to be the best. Now you can say to dealers, "Sure, I'll work with you on ranges which you sell bearing this little C P seal." No utility executive could go wrong in helping dealers to help the gas company through the cooperative promotion and sale of such high quality merchandise. This furnishes you and the dealer a common meeting ground for your mutual benefit.

Here is another point of importance to you. Just as the C P seal enables the customer to buy a range with confidence, *so can you buy ranges from the manufacturer with*

Confidence. Here is a saving because it enables you to eliminate expensive laboratory testings and delays in buying for fear of inferior merchandise. You can buy C P ranges in carload lots without fear of a mistake.

Last, but most important. (6) *It will protect and extend the reputation of gas as a fuel.* In the first place, it will give the consumer a range as good as the fuel, a range designed and built to really take advantage of all the superiorities Gas has over other fuels, take them and translate them for the housewife in terms of super-performance, super-convenience and super-economy. In the second place, this program will mean more good gas ranges competing with electric ranges. In comparing the merits of the two fuels the public will be able to really see what gas can do, and justly evaluate it. In the third place, the introduction of the C P range and the resultant increase in sales of the more expensive models will tend to counteract the bad effects of low-price, low-standard models. This will remove one of the worst influences we have been faced with in the past in promoting our fuel.

In summary, to the Gas Industry, the C P Gas range means two big things:

More Range Sales—for More Money
More Fuel Sales—for Better Satisfied Customers

Certainly no utility man can afford to sit passively by and let this big opportunity slide by without helping to push the Band Wagon! True, it does not start 'till August 1st—*but:*

Here's what *you* can do about it *now*

1—Organize your Sales Force.
2—Train your Sales Force and Employees.
3—Start Gathering Prospects.
4—Prepare your Campaign Theme.
5—Get more Sales Outlets.

YOUR SUCCESS DEPENDS ON YOU!

What the CP Range Means to the Appliance Dealer

ONE of the biggest wrinkles in the appliance dealer's brow comes from wondering how he is going to get more business this Fall. The refrigeration market is 50% saturated. The high and middle income groups have already been well sold. But—now comes the C.P. Gas Range and makes millions of these same homes immediate prospects for another kitchen appliance. And the same time and food saving story that sold over 2,000,000 automatic refrigerators last year is just as applicable or even more so to this new product.

The first big thing about the C.P. Range as far as the dealer is concerned is that it **should bring many more prospects into his store than he ever saw before.** Many gas ranges up until now have lacked merchandising appeal. The housewife has been slow to believe that the modern range is essentially different from her own old gas stove. But the C.P. Gas Range will change all that, because it is something really new and revolutionary.

It will identify the appliance dealer's store with a National Promotion. The housewife will see the C.P. range advertised in the best magazines, hear about it on the radio, read of it in the newspapers and hear her friends talking about it. The housewife will insist on going down to her dealer's showroom and on looking it over herself. In the meantime, she is going to do a little thinking about the ten year old stove at present standing in her kitchen.

When more prospects come into the store, the volume of sales will

almost surely increase, especially if the merchandise is attractive, reasonably priced and certified as to performance by an organization of high national standing.

Now, for the first time, the public will have a way of knowing what **is** the best. For the first time they can be confident of buying a range of **known** performance and quality.

Just what makes this a super range? What are the details of its construction? What makes it the best cooking appliance ever offered to the public? The specifications were written to accomplish improved convenience, efficiency, and cooking results, and to save the housewife time, fuel, and food. Let's look at this new development, point by point.

To merit the C.P. seal, a gas range meets the following convenience features in each of the three cooking zones.

1. TOP BURNERS

(a) Each C.P. range has one or more Giant Hi-Speed Burners. Here's speed unexcelled by any fuel, assured by a minimum input of 12,000 BTU per hour. This is the first high speed standard ever required for any range. No impatient waiting for water to boil—a real time saver.

(b) All top burners have automatic top burner lighting—no matches. Just turn the handle for instant full heat—no waiting—another time saver.

(c) All C.P. range top burners have enamel finish or are constructed of rust resisting metal. This convenience specification saves time formerly wasted in keeping a stove bright and clean.

(d) New developments in burner design and efficiencies assure the customer that gas burns absolutely clean. The C.P. gas range, with its scientifically engineered burners, produces a clean, blue flame which always leaves pans with mirror brightness. Another time saver because scrubbing and scouring of pots and pans are eliminated.

2. OVENS

(a) Ovens will heat to uniform temperatures of 500 degrees in about half the time required of ranges of former standards. This means a 350 degree baking temperature in less than 6 minutes. Another time saver.

(b) All C.P. ranges have automatic oven lighting. This means not only complete elimination of matches, but oven doors need no longer to be opened to light the burner. Now we have a truly matchless service. Again we say "just turn the handle."

(c) The oven vent on the C.P. range will keep the food vapor laden air away from walls. Another convenience which saves cleaning time.

(d) New improved insulation requires that an oven while maintaining a 500 degree temperature on the inside, shall not exceed a temperature of 75 degrees above room temperature on the outside surface. This feature, with more efficient oven burners, means that the heat is going into the food instead of the kitchen. This means a much cooler kitchen.

3. BROILERS

(a) Broilers in C.P. ranges heat to a 600 degree broiling temperature in ¼ less time or 5 minutes quicker than ranges of just a year ago. This faster broiler saves the housewife still more time.

(b) All broilers have automatic lighting—again no matches—no time spent opening and closing broiler doors—more time saved!

(c) The minimum effective broiling areas are 43% greater than ever before. For example, this means more chops, a larger steak, or an extra row of toast may be browned to an even uniform "doneness" where formerly an extra broiling process might have been required. Another time saver and gas saver—and less heat in the kitchen.

(d) New improved C.P. broiler insulation makes the kitchen comfortable because of a minimum allowable surface temperature over 50% cooler than before.

So, to the dealer the Cooking Perfection Range means increased business because: First, it is going to turn up, and keep turning up, a steady stream of new prospects. Second, it will be the means of selling them, regardless of type or classification, a NEW GAS RANGE. In other words, in these days when a product, to sell, must offer something dramatic and revolutionary, the C.P. range is good news indeed to the appliance dealer and salesman.

Photo Blank & Stoller

The CP Range Committee in Session

The progress made so far in preparing for the opening of the nationwide drive on CP Ranges was approved by the joint committee of manufacturer members of the Association of Gas Appliance and Equipment Manufacturers and gas company executives representing the American Gas Association. F. M. Houston, of the Rochester Gas & Electric Corporation, of Rochester, N. Y., chairman of the committee, presided.

In order to insure complete coverage, the entire United States was divided into sixteen regions with a "regional manager" in charge of each. These regional heads assisted by state and district managers will conduct a series of demonstrations and lectures on the Cooking Perfection Gas Range Program for utility representatives and retail dealer outlets.

F. X. Mettenet, V. P. Peoples Gas Light & Coke Co., speaks on "What the Sales Manager Expects of Home Service."

Home Service Conference and Training Course

At the Home Service Conference and Training Course in Kansas City, Mo., the week of June 7th, a large registration gave enthusiastic support to a fine group of papers depicting every phase of Home Service operation carried on in the gas industry today.

Mildred Clark, as chairman of the Home Service Committee, presided most efficiently at all sessions, outlining at the start the reason for giving the course.

Home Service as an aid in sales promotion was the keynote of the meeting. This was brought out in dramatic fashion by the use of skits and demonstrations.

Another means of presenting sales slanted information being utilized by home service today, that of drama in cooking demonstrations, was illustrated by Elizabeth Lynahan of The Peoples Gas Light & Coke Co., in Chicago, who presented a truly "model" demonstration.

One skit of the program was entitled "Drama in Water Heating" and presented by the home service department of the Kansas City Gas Company under the direction of Colleen Fowler.

Instruction on appliances was conducted by specialists in the work and the modern gas range was presented by C. C. Young of the Gas Service Co., of Kansas City,—climaxing his talk with the latest information on the C.P. range activity.

The cycle of operation in gas refrigeration was told well by Jane Tiffany Wagner of Servel, Inc.; in the discussion following R. C. Bon-Seigneur, District Sales Supervisor, assisted Miss Wagner in pointing out the new features in the gas refrigerator.

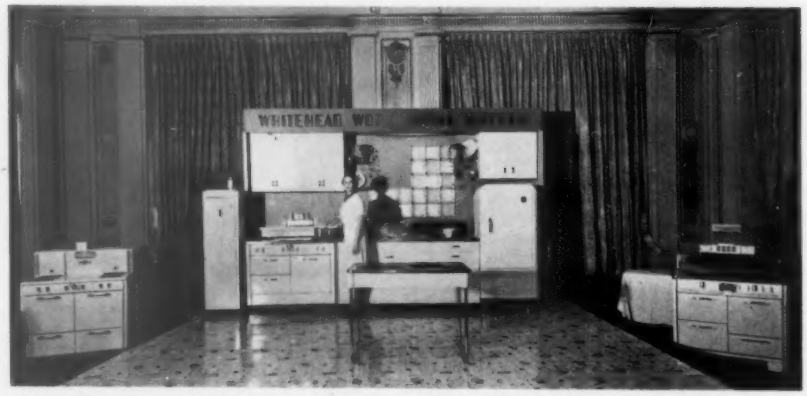
The mechanics of home service operation were developed from many angles,—Vera Carter Ault of the Public Service Co. of Colorado, at Denver, described the uses made of Gas Hospitality House,—this auditorium set up to dramatize natural gas to the public.

Newspaper cooking schools,—carried out to such success in the Southern Counties Gas Company, were described and illustrated with slides by Margaret S. Lackland of Santa Ana, California.

Home service in Canada, with special emphasis on Women's Club programs, created an interesting presentation by Elsie Currie, The Canadian Western Natural Gas, Light, Heat & Power Co., Ltd., Calgary, Alberta, Canada.

"Putting the Most into the Home Service Dollar" led off the home service conference in a discussion by Jessie McQueen, Home Service Counselor, the American Gas Association. Miss McQueen described the characteristics of home service work, the type of people needed for it and mentioned courses which could best prepare students in colleges who desired to enter home service work.

"What the Sales Manager Expects of Home Service",—this, a challenge, presented by F. X. Mettenet, Vice President, The Peoples Gas Light & Coke Co., was received with enthusiasm as he brought out many ideas as to not only what the sales manager desired but outlined means of accomplishment.



Elizabeth Lynahan, Peoples Gas Light & Coke Co., presented a model demonstration using this modern kitchen display.

The CP Gas Range

By
W. E. Derwent
Chairman CP Range Committee
Vice President George D. Roper Corp.
Rockford, Ill.

THE CP Gas Range was conceived with one great objective in view — to give the American housewife a cooking unit that would out-perform that using any competitive fuel.

It represents the best thought, engineering and sales brains of the gas and gas appliance industry.

Its construction has caused the investment of hundreds of thousands of dollars and many headaches on the part of the gas range manufacturers, which investment is expected, through sales promotion on the part of the gas industry and the manufacturers, to give a satisfactory return to those manufacturers who are building these CP Ranges.

The requirements governing the construction of these CP Ranges, covering 22 "must" requirements and 7 "optional," are of such a character that they guarantee to ultimate users:

1 — Speed
2 — Instant visible heat
3 — Simplicity of use
4 — Controllability
5 — Economy

No competitor can deny these advantages.
This CP Super Gas Range has been well named —"The Gas Range of Tomorrow" and with it the industry will go far.

A group of manufacturers have given this activity their full support and will through their own Advertising and Promotional Sales Departments do more than their full share to the end that the American housewife will have a full knowledge of the benefits to be had through the use of gas as a fuel through the medium of the CP Range.

The manufacturers certainly have shown their keen appreciation of the need for a super appliance of this character by their wholehearted support to the program. Not only have enormous funds been expended to bring into being and manufacture this CP unit, but they have further shown their faith by underwriting to the tune of many thousands of additional dollars the promotional sales plan to tie in with the A.G.A. National Advertising to eventually sell the trade-mark CP as a hall mark of quality for gas ranges.

I am sure that I speak for the manufacturers involved in this activity who by their abiding faith in the program and their actions have proved to all purveyors of gas appliances and to the world at large, their desire and ability to produce the finest cooking equipment, with an advertising and merchandising plan behind it, that will spell profits to all retail outlets.

Among the eleven range manufacturers who will market one or more models of ranges which conform to CP requirements, the following eight have furnished us descriptions and photos. One model of each manufacturer is shown. Up to the time of going to press, we had not received descriptive matter from the remaining three.—Ed.

The American Stove Co.
Cleveland, Ohio

Series 4000 and 4100 are "Magic Chef" gas ranges which include all specifications of the "CP" range. The illustration is the series 4000. Equipment includes the "Magic Chef" oven of semi-direct action type, and Lorain oven heat regulator. Divided cooking top with two burners on each side. Oven and broiler insulated. New style burner trays, which conceal the burners except the burner head. Grid pan broiler of swing out type. Three-in-one top burners for simmering or fast fire burner. Service drawers automatic top lighters, high burner tray, timer, and electric light.

American Stove Co., Series 4000 CP Range.

Detroit-Michigan Stove Co., Detroit, Mich.

Several models of "Detroit Jewel" and "Garland" ranges meet all "C.P." specifications. Model illustrated is "Detroit Jewel" No. 6872 and "Garland" No. 3872.

These models are designed specifically to fill the need for a built-in range. They are square, with no overhanging parts.

"Detroit Jewel" No. 6872 and "Garland" No. 3872 CP Range. Detroit-Michigan Stove Co.

Regular equipment includes porcelain finish top grates. Flush cooking top. All top burners are Harper Speed + Simmer type, providing simmer only or varying degrees of full flame as desired; one giant Speed + Simmer burner is included. Chrome finish burner pans around top burners. A turn of the burner controls lights top burners automatically. Large, one-piece porcelain finish baking oven. Baking and broiling ovens are well insulated. Porcelain finish oven bottom tray slides out easily for cleaning. Oven heat control has easily read visual temperature-indicating signal. Drawer type broiler operates on ball-bearing rollers and has chrome pan and chrome smokeless grill. Range is finished in gleaming white and black porcelain, with base in matching Detro-loid. Cooking top may be either Monel metal or porcelain finish. Attractive lamp, time reminder, and condiment set.

Nos. 6872 "Detroit-Jewel" and 3872 "Garland" have four top burners arranged two on each side of the top, and a convenient elevated drawer type broiling oven with spacious utility drawer below.

Estate Stove Co., Hamilton, Ohio

Revised editions of the four most popular models in its 1938 line will comprise Estate Stove Co.'s initial offering for the CP Range.

Current model names and numbers will be retained but the suffix CP will be added to the model number to indicate that the range complies with the CP specifications. The CP emblem will be displayed on the range.

Model 515-CP Estate is a 41-inch range. Its equipment includes bake oven, waist-high drawer broiler, combined utensil compartment and warming oven, four cooking top burners, griddle plate and table-top section, two folding cooking top covers.

Model 516-CP is identical with Model 515-CP, with the exception of the griddle plate.

Model 515 CP and 516 CP. The Estate Stove Co., Hamilton, Ohio.

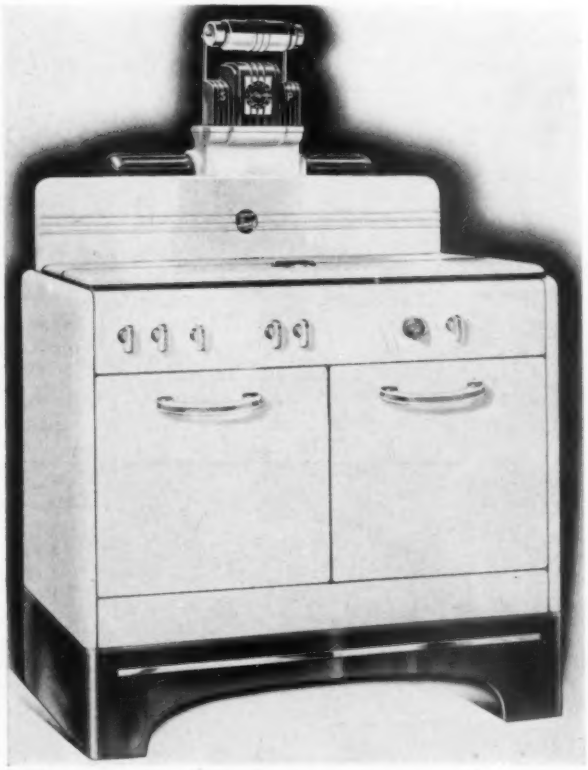
Model 954-CP is a 36-inch range. Its equipment includes bake oven, waist-high drawer broiler, utensil compartment, four-burner cooking top, griddle plate and table-top section, two folding cooking top covers.

Model 950-CP is identical with Model 954-CP except for the omission of the griddle plate and the top cover over the table-top section.

All ranges comply strictly with the standard CP specifications, including automatic lighting of the bake oven and broiler with automatic cut-off feature, all cooking top burners of the double duty type, one giant burner (12,000 BTU per hour), etc. In addition, all CP Estate Ranges have Estate's new "V-58" oven burner, "Mechanical Hand" and other exclusive Estate features.

Glenwood Range Co. Taunton, Mass.

Illustration shows number "410 CP" range, one of several models including all specifications of the new CP range, as well as additional features. It is planned that C. W. Merrian, Jr., will devote considerable time to gas company sales group meetings to tell the retail gas appliance salesmen of the advantages to all parties concerned of selling CP ranges.



Roberts & Mander CP Range D916.

Roberts & Mander Stove Co. Philadelphia, Pa.

Illustration shows the "Queen" Quality "CP" Gas Range Model D916, featuring built-in deep well economy cooker and five du-all top burners, one of which is an extra capacity burner, automatic top burner and cooker lighting, full insulation, one baking oven, illuminated, visi-therm oven heat control, separate drawer broiler compartment with radiant nichrome burner, cast aluminum broiler grill, automatic oven and broiler ignition, ("radiant" or pilot type), oven flue diverter, full length, balanced, folding coverall, non-tilt oven racks condiment set, minute minder, skirt base, fits flush-to-wall, right oven only. Available Extras: automatic clock control, circulating hot air warming compartment, recessed base, lamp.

Geo. D. Roper Corp., Rockford, Ill.

Several 1938 models are built to meet all CP range specifications. The model illustrated is the "Fleetwood."

Features include High Roll Broiler with Roper Aluminum Grill, 1 "Giant Simmer-Speed" and 3 "Simmer-Speed" Burners, "Super-Speed Low Temperature" Oven with Super-Insulation, Large Roll Drawer, and Chrome Tubular Range Supports.

Roper "Fleetwood" CP Range. George R. Roper Corp., Rockford, Ill.

Standard equipment includes: One "Giant Simmer-Speed" and three "Simmer-Speed" Burners. "Air-Stream" Cooking Top. "Insta-Flame" Top Lighter. Two Counter-Balanced and Lined Lift Covers. Enameled Burner Tray. Thermal Eye Oven Control. Large Super-Insulated Oven. "Super-Speed Low Temperature" Oven Burner. "Lifetime" Cooking Chart. "Non-Sag" Locking Oven Racks. Astogril Roll Broiler —Super-Insulated. Two Large Roll Drawers. Timer Alarm. Distinctive Crockery Condiments. Modern Leg and Base.

Glenwood No. 410 CP Range Glenwood Range Co., Taunton, Mass.

Standard Gas Equipment Corp.

The Standard Gas Equipment Corporation announces its initial line of CP Ranges. There will be six of these ranges ready about August 1st.

All of these ranges meet the 22-specifications set up for CP ranges; also the 10-optional features, and have in addition certain exclusive features.

The top number in the line is the 4450-1-CP. This is a 41" range, has elevated ball-bearing smokeless broiler, with aluminum grid and chrome plated pan, and automatic lighter. The range will have the high built-in type mantel back and will be provided with spring balanced lift covers, divided so that range can be easily fitted under low cabinets. It is marbleized enamel so as to present a better working surface. It is equipped with 1-giant (12000 BTU) and 5-standard aluminum Speed Simmer Burners. The burners are spaced at 11¾" centers, grates are unusually wide, so as to provide ample space for large pots.

Standard Gas Equipment Corp. Model 2502 CP Range

The range is provided with a daylight enamel lined oven, high speed type, heated by extra fast burners, lighted by automatic lighter, and can be operated at temperature of 250 degrees for low temperature roasting. As special features the oven has removable rack slides which expose the entire interior of the oven for easy cleaning and insulated oven bottom. The insulation is rock wool, carefully packed and held in place. Heat Control is Robertshaw. Underneath the oven is a separate browning oven.

The illustration shows Model No. 2502-1. These ranges are made in two models, one with the large heated warming closet and insulated cooker. Broiler is underneath the oven and is ball-bearing drawer type with enamel smokeless grid.

Tappan Stove Co., Mansfield, Ohio

Illustration shows the Tappan WDX—19 gas range, one of their models built according to CP specifications.

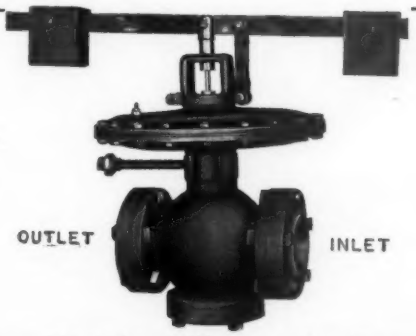
Equipment includes—Divided Cooking Top — One Piece Die Formed. Drop Back Covers—Spring Balanced. Center Service Table. Top Grates, Porcelain. DeLuxe High Back Splasher. Opal Glass Electric Light. Electric Clock. Tappan Timer. Chromelite Finish — 4 Dual Giant. Automatic Instant Top Burner Lighting. Porcelain Enamel Burner Trays. Oven Heat Control—Robertshaw. Flexo-Speed Oven with Low Temperature Burner. Hand Packed Rock Wool Insulation. Non-Tilting Oven Racks with Positive Stops. Removable Oven Bottom Tray. Oven Burner Lighter Port. Safety Concealed Oven Valve and Heat Control Dial. Automatic Oven Door Stop. "Visualite" Oven, with—(a) Pyrex Glass Door, (b) Electric Interior Oven Light with "Peek" Switch, (c) SaniClean Chromium Oven Linings, (d) Chromium Door Lining. Ball Bearing Broiler Drawer with Drop Door. Demountable Drawer Glides. Warming and Storage Compartments. Cutlery Drawer. "Peek" Switch in Right Compartment.

Tappan Model W.D.X.-19 CP Range. Tappan Stove Co., Mansfield, Ohio.

The preceding pages give you a vivid picture of the new CP ranges, with descriptions and illustrations. Mr. Houston tells you what it means to the gas utilities. For the dealers, too, its advantages to them are pointed out. Mr. Derwent, Chairman of the Committee, gives you the manufacturers' side of the story.

You have now the finest cooking appliance ever offered the public, no matter what fuel is used. The manufacturers have not only met every specification of the CP range but have added appealing features. The manufacturers have placed their case before you. You, as the jurors, must decide the future of this superlative product. If your verdict is favorable, then you must get behind this new CP range. We believe it is what you have been looking for—a gas range which, from the point of beauty, economy, automatic controls, and with features never before included in a gas range, meets and surpasses the competition of every cooking appliance.

There can be no alibis if this new range does not immediately take its place as the leader in the kitchens of the land.—Ed.



Fulton Weighted Illuminating Regulator

Works On Low Inlet Pressures

C-F Inlet pressures of 15 pounds or less can be reduced to delivery pressures anywhere between one ounce and five pounds, under perfect control, with the Fulton Weighted Illuminating Regulator. Designed for either natural or manufactured gas. No stuffing box. Practically no friction. Highly sensitive. Write for Bulletin No. 2574 giving full information, also Catalog of C-F Regulators for all requirements of pressure control.

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All sizes up to 3,400 cu. ft. capacity

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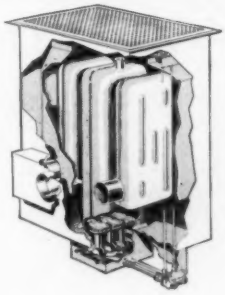

The Payne Floor Furnace is one of the greatest load builders on the National Heating Scene.

That's because its exceptional efficiency and economy of operation sell the *idea of GAS*—tell people that GAS is the ideal fuel for *all* purposes.

The Payne Floor Furnace is one of the most popular gas-fired heating units in the land today. It should be.

Payne has devoted a quarter of a century to the making of gas fired appliances *exclusively*. And today, in America's most modern furnace plant, Payne produces America's most modern gas-fired heating appliances!

Payne THE IDEAL FUEL GAS

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BEVERLY HILLS, CALIFORNIA

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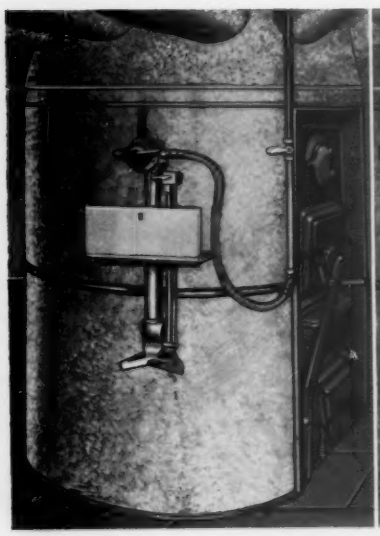
STANDARD ASSEMBLY

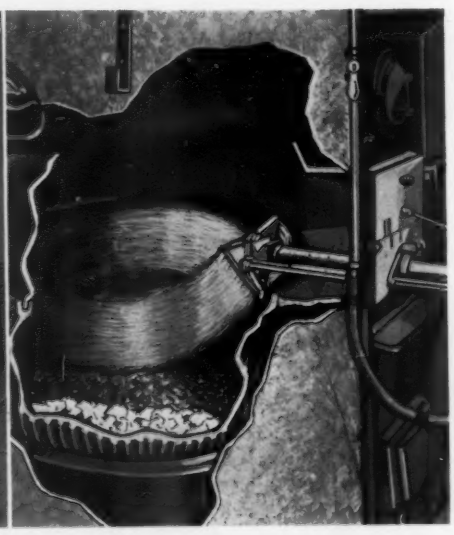
Includes Burner, Electric Gas Valve, Heat Accelerating Wall Type Thermostat, Safety Pilot, Transformer, Thermostat and Transformer Wire, Flexible Gas Connection, Hanger and Damper Stop.

PRICED TO OPEN A WIDE GAS HEATING MARKET



Hangs on side of heating plant when solid fuel is being used.

Easy to place in operation in furnace or boilers.



The heat is applied low in the firepot giving combustion efficiencies comparable to gas designed equipment.

FOR FURTHER DETAILS WRITE

HANDLEY-BROWN HEATER CO.

JACKSON, MICHIGAN

Central Hudson Gets Real Dealer Co-operation

By
J. E. Bullard

THE Central Hudson Gas & Electric Corporation, Poughkeepsie, N. Y., has secured the maximum of co-operation from dealers by going the entire distance itself. It does not buy and sell appliances. It does not act as a wholesaler of appliances. Financing is done through a finance company and though the utility does the collecting it does it for the finance company and not for the dealer.

No gas man needs to be told that dealers are inclined to be suspicious of the gas company in regard to its policy in the sale of appliances. In spite of the fact there appear to be certain advantages when the gas company acts as wholesaler, there are also disadvantages. The gas company is not likely to stock all the makes of appliances. What it does stock it may sell at lower prices to the dealer than a dealer will have to pay for appliances of some other make which he buys in small quantities. This means that the manufacturers who do not sell to the gas company, who have not succeeded in getting any orders from it and the dealer who would like to sell some other make than the gas company stocks, are not altogether satisfied.

This fact, of course, is apparent. When the Central Hudson Gas & Electric Corporation, back in 1928, decided to turn the selling of appliances over to the dealers, it was convinced that it could do more business and at less cost, with the dealers all selling than would be the case if the company continued to sell appliances directly to the consumers. Selling directly to the consumers is almost certain to cause more or less ill will among the dealers. Experience has proved this beyond question. Even if the dealers do not go as far as those in Oklahoma did and have a state law passed prohibiting the utilities from selling appliances, they tend to lower appliance sales by featuring and pushing the sale of appliances which do not use gas.

Protects the Dealer's Profit

The dealer knows the gas company can sell appliances at a margin much lower than any dealer can handle them. He knows the company can even sell them at less than cost. The gas company is interested in the sale of appliances primarily for the purpose of increasing gas sales. Any profit made on appliances, the dealer believes, is of minor importance to the company. When he sells them, however, the profit on them is of major importance to him. With this great difference in objectives, the dealer cannot be blamed for fearing competition from the gas company.

Just so long as the gas company sells appliances there is no certainty it will not conduct campaigns which feature prices and terms the dealer cannot possibly meet. Should he have a stock on hand, the possibility of ever selling it at a price which will allow him to break even becomes dimmer and dimmer as such campaigns are conducted. Such campaigns have been conducted in the past. As long as the gas company continues to sell appliances there is no certainty they will not be conducted in the future. The dealer, therefore, is taking a greater risk when he sells gas appliances than he is taking when he sells practically anything else.

Many gas men have given me any number of reasons why the gas company must at least act as a wholesaler. The reasons given are perfectly logical. There are certain aspects, however, which are usually overlooked. When the gas company acts as wholesaler and sells to the dealers, it may or may not take the regular wholesaler margin. At any rate it still controls the retail price of the appliances to a marked degree. It can conduct a campaign which offers prices and terms which no dealer not buying from the gas company can meet. It is merely a matter of selling the appliances to the dealers at less than cost and financing all sales itself. If a dealer has a stock which he has bought directly from the manufacturer, he finds himself in exactly the same situation as in the case when the company is selling appliances directly to the consumers. This fact serves to explain why it may be so difficult to gain the complete co-operation of all dealers when the gas company wholesales appliances to them.

More Good Makes Offered

Another phase of the situation is that the gas company is not likely to stock all makes of appliances. The manufacturer who does not succeed in selling to the company is pretty much kept out of that territory. The dealer who buys directly from the manufacturer, as already has been pointed out, is taking more or less of a chance. It all simmers down to the fact that as long as the gas company even wholesales appliances it is in a position to dictate to the dealers and the dealers do not like dictators, especially when those dictators are large corporations.

It might seem and undoubtedly does seem to many gas men that it would not be practical to turn the selling of appliances completely over to the dealers. Ever since gas appliances have been sold, it has been the practice of the companies to keep control of their sale. There have been but few exceptions to this rule. Some of these exceptions have been municipal plants. The dealers were able to control enough votes to prohibit the municipal plant from selling any appliances at all.

It was in 1928 that the Central Hudson Gas & Electric Corporation adopted its present system. Since then it has not even wholesaled appliances. Yet, there has been no falling off in appliance sales in the territory it serves. The years 1928

and 1929 were years of good business. Then the depression set in. The difficulty of increasing sales continued till there was some pick up in business conditions in 1936 and 1937. These ten years have not been good years for making increases. If there was anything wrong with the plan the Central Hudson Gas & Electric Corporation is using, we could not expect the gas consumption per customer to any more than hold its own. Actual experience, however, has shown an actual increase of over 32 per cent. **The gas consumption per domestic customer was 22.3 M. cu. ft. in 1928 and is now 29.5 M. cu. ft. per year, for year ending Apr. 30, 1938.**

The feeling the company had that by means of this system it could attach more business for less money has been realized.

Utility Salesmen Help Dealers

A vital feature of the system, however, is that the company sales force has not been reduced. The same number continue to be employed as before the dealer plan was adopted. Had the sales force been discontinued and everything left to the dealers, the sequel would have been far different from the present one.

There are 27,000 customers in the territory served and there is one supervisor and fourteen men in the sales department. The difference between this and the old plan, as far as the salesmen are concerned, is that they work with and for the dealer. Each dealer works out his own arrangement in purchasing appliances. Not even group purchasing is employed. The company does advise with the dealers and helps them in setting up plans and types of equipment which they should buy and sell. Under this plan, however, the dealer has the last word rather than the gas company. The appliance business has actually been turned over to the dealers.

An important job of the sales department and one which is never finished is getting small and large dealers to become better merchandisers. The force can keep quite busy at this job. It is actually a case of keeping right after the dealers much as a sales manager keeps right after his salesmen to make them sell more. The salesmen, however, are required to make a certain number of calls on consumers every month. Sales made are made for the dealers. The sale is either made on a lead from a dealer or if it is a straight canvass sale, the consumer states which dealer shall have the sale.

Working through the dealers in this way, the result is that there are many times as many actual appliance salesmen in the territory as would be the case were all the selling done by the gas company itself. The dealers are making profits on the appliances they sell. There is little doubt that they are making more profits than they would were it not for the merchandising advice and counsel given them by the company's representatives.

Now that they can feel certain the company will not compete with them, offering competition they cannot meet, they can well afford to put a great deal of effort back of appliance selling because each increase in effort means an increase in volume and that means an increase in net profit. There is the same degree of competition between small dealers and department stores there is in other lines but there is not the type of competition gas companies have been prone to offer in past years and which has led dealers to become so suspicious that they do not dare to go far in the direction of co-operation.

Dealers Use Utility Windows

The local offices of the company have spacious display floors and splendid windows. In them, dealers make displays. The company helps them in making such displays, if the dealer wishes. The space, however, is not given free. A nominal charge is made. In exceptional cases, the company makes displays of its own but this is the exception rather than the rule. The nominal charge serves to keep the small dealer who for one reason or another does not make displays in the company's windows or on the display floor more contented. He knows the dealer who does make them is paying for the space. He is not getting something for nothing. The company is not playing favorites.

The company does some newspaper advertising and it publishes a little pictorial house organ called the Gas and Electric Family News. It has been found that consumers like to have their pictures and the pictures of their kitchen or other new appliances they buy, printed in it. Contests are conducted through the house organ for the purpose of determining the reader interest.

As has all ready been stated, the financing is done through a financing company. The set up is such that the dealers can sell their time payment paper through the company to the financing organization. This serves to make it easier for the small dealer, in many cases, to arrange the financing of time payments than would be the case if he had to deal directly with the finance company.

The real secret of the success of this plan appears to be that the sales department became, with its adoption, strictly a sales department. No longer did it have to concern itself with buying and stocking appliances. No longer did it have to maintain an installation department. The dealers took over these tasks. The sales department devoted itself entirely to selling through the dealers, allowing those dealers to buy the appliances they decided to buy.

In this respect the plan is not so much different from that which is used by many large manufacturers. They have found it profitable to employ men to teach their dealers how to sell more of their products. Conditions in the gas industry in the past have not been such as to make it practical for the average gas appliance manufacturer to maintain a staff whose duty it is to teach the dealers how to sell more gas appliances. For this reason, when the gas company turns the selling of appliances over to the dealers, it must take over this work of teaching them how to sell them, if the plan is to be a success.

As the dealer who is competing with the gas company in the sale of appliances is likely to look upon the company in very much the same way that a utility company looks upon a government operated and owned utility which is competing with it, the advantage, in the long run, of the Central Hudson Gas & Electric Corporation plan can be seen. The dealers in its territory can hardly arouse very much united ill will against the company for the simple reason they know the company is helping them to make more money than they would be without the co-operation of the company.

Here is a case where we find a gas company really co-operating with the dealers rather than asking the dealers to co-operate with it. At the start, there was the usual suspicion. There were dealers who were certain the idea was too good to be true. Even when they were assured that as long as there was no falling off in appliance sales, the company would not go back into the appliance business they accepted the statement with a grain of salt. It was just as important a selling prob-

lem to sell these dealers the idea of selling more appliances and the idea that the company really would not go back into the business of selling appliances as it ever had been to sell appliances directly to the consumers. It is still an important task.

Dealers Pull for Gas Appliances

The sales force is just as essential under this plan as it is under any other. The main difference is that when a salesman does his selling work through a dealer he is likely to sell indirectly a good many more appliances than he could by devoting all his time to selling directly to the consumers. Under this plan the actual effective force of the salesman has been increased. However, it would be an error which might show up in the form of reduced gas consumption were the sales force to be discontinued.

Competition continues. Manufacturers of appliances which do not use gas are also trying to sell through dealers. They are trying to sell these dealers the idea they can make more money by selling their appliances than they can selling gas appliances. If the gas company ceases to help the dealer sell gas appliances while these no gas using appliance manufacturers help them sell their appliances, it follows that the dealer is not likely to make as much profit on the gas appliances. There is no one helping him make a profit on them.

The one thing, above all else, that the Central Hudson Gas & Electric Corporation has demonstrated during the ten years it has been using this plan is that when the gas company co-operates to the full with the dealer, the dealers sell more appliances than are sold under any other arrangement. It has demonstrated that gas sales can be increased to a greater degree and at less sales cost where there is full co-operation with the dealers than they can be when that co-operation is lacking. The final conclusion one is forced to draw is that this is not only the most profitable appliances selling plan but also the safest.

In these days when there is a swing back toward government owned and operated public utilities, when the public seems to have forgotten its experience of thirty or forty years ago with municipally owned plants, it is extremely important that every gas company as well as every electric company have just as many friends as it can have. The only way that the dealers can be made the real friends of the gas company is for the gas company to help them make more and more money selling gas appliances. That is actually happening in the territory of the Central Hudson Gas & Electric Corporation. There can be little doubt that it is the most effective rebutal to the arguments of the politicians who would have all the electric business and then all the gas business taken over by the government.

Gas Cuts Heating Costs

The well-known Scarritt Building (offices) and the adjoining Scarritt Arcade, in Kansas City, were heated by gas last winter. A material savings over steam purchased before was effected. Last September two steam boilers fired with gas burners were installed by the Kansas City Gas Co. W. H. Scarritt, manager, The Scarritt Estate Co., states that "Our saving in heating expense is equal to or better than represented and is quite material in amount."

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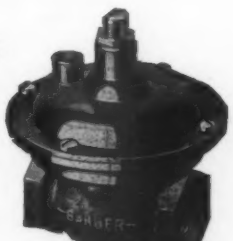
Barber Regulators have everything that a Quality Regulator must have—compact, attractive appearance in keeping with the modern trend in heating equipment design—high precision standards of manufacture—operate at very low pressure drop. All bronze body, brass working parts. Sizes ¼" to 1½", A. G. A. approved. Write today for catalog and prices on the complete line of Barber Conversion Burners and Regulators.



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THE ALPHA-LUX COMPANY, Inc.
192 FRONT ST., NEW YORK
Philadelphia **Chicago**

The Sales Training Program of New England Gas Association

By

Clark Belden

Executive Secretary N.E.G.A.

THE sales training program launched by The New England Gas Association last fall and still in operation has received the widespread support of the gas companies in that area, many of them having already reported constructive results to their salesmen.

This program represents an expenditure of more than $8,000 by the various companies which are participating in it.

The directors of the Association authorized this program early in 1937 because they felt that the program as developed by a committee during a year and a half of previous planning would provide a sales stimulus for the member companies which would be worth the substantial time and money involved.

Months of study and planning by a special committee composed of directors of the Manufacturers and Sales Divisions of the Association ironed out various wrinkles. Thus, the Association directors were requested to approve the financing of a program which had been very carefully discussed by and with many of the Association members. The interest shown in the sales training program during these preliminary stages was an important factor in the decision of the Association's directors to underwrite the program's cost and order full speed ahead.

A major step which Association officials took was to employ, at the special committee's suggestion, the Bureau of Business Research, College of Business Administration, Boston University—the largest in New England—as an active cooperating research agency. Ralph G. Wells, head of the Bureau, and a number of his faculty associates played an important part in the program's final success.

Professor Wells conducted long interviews last summer with many sales executives and manufacturers as a part of the process of preparing the program. A subcommittee of the Sales Development Committee in charge of the program, as well as the committee itself, spent considerable time on the program. This subcommittee was composed of Carl H. Cummings of Boston, chairman of the main committee, Professor Wells and the writer.

The process of bringing the program closer to its final form was an interesting adventure among the policies, practices, opinions, results, successes, failures and conclusions of the New England gas companies. It represented far more than taking an inventory of an industry's regional sales pulse. It represented an effort to construct something that would be sound and of widespread use and value. The program was about as far from a "canned" program as it could be. It was, in fact, a tailor-made job.

The program, as introduced last November, contained 3 main parts: a 3-day seminar for sales managers and their immediate associates; a series of 4 1-day, 3-session, regional meetings for salesmen in Boston, Springfield, New Haven and Providence; and a textbook entitled "A Sales Development Program" for the use of salesmen in the classes that were to be held by the various companies, starting early in January, 1938.

There was an attendance of 107 at the sales managers' seminar in November. There were 8 sessions in 3 days, each session lasting about 2½ hours. A variety of questions essential in the sales management phase of the gas industry were discussed. There were 10 or 12 speakers from the sales management phases of industries with selling problems similar to those of the gas industry, as well as appropriate speakers from Boston University's staff.

The second part of the program, the regional meetings for salesmen drew a total attendance of over 600 men. Identical programs were provided in the several cities. Here again, these speakers represented sales management from other industries and Boston University's staff, as well as some speakers from the gas industry. The objective of these meetings was to encourage, stimulate and inform the salesmen with respect to their field of work and its possibilities.

The third part of the program consisted of the salesman's textbook of 21 chapters and the instructor's guide which gave substantial help to company representatives who acted as class instructors.

In gradually developing and perfecting the program over a period of many months, one of the numerous obstacles with which the Sales Development Committee and Boston University were at one time or another confronted was the testimony of various sales managers that most of their salesmen had taken some kind of sales course and, thus, it was feared that many salesmen might view the Association's project as just another course. As the textbook material began to take definite shape, it was felt that there was such a pertinent and interesting variety of ideas and methods that the salesmen would accept and like this particular job. When the company classes swung into action throughout New England early this year, advance reports indicated that even the most experienced salesmen were very much interested in the textbook's contents and methods and that, in more than a few cases, it was proving difficult to complete the company classes at the scheduled time because there were still so many things which the class members wished to discuss without having to wait a week for the next class!

After careful study and consideration, 3 policies were established by those preparing the salesman's textbook and the instructor's guide, which policies were felt to be sound.

Perhaps, the most important of these policies was that the material was designed to be handled by the conference or discussion method, rather than by the lecture method. This afforded ample opportunity for the members of each class to comment upon each chapter or to ask pertinent questions. This method not only kept the class members awake, but it kept more than a few of them on the edge of their chairs either to comment upon some part of the text or upon some statement made by another class member!

The second of the policies was that alternatives were presented in various parts of the text. That is, while various suggested methods were evaluated with respect to their strong and weak points, no effort was made to be dogmatic and indicate that any one method was the best under any and all conditions. For instance, one chapter is entitled "22 Ways to Approach a Prospect;" another is entitled "22 Points Regarding Interviews;" still another is captioned "24 Conclusions Regarding the Trends of Gas Appliance Selling." The class discussions have indicated that no one method is best for all men and that each man should use the method best adapted to his personality and ability, and to the given circumstances.

The third policy was that specific and exact sales talks, to be memorized, were not presented, but rather a careful discussion of the fundamentals involved in the different situations. Thus, each salesman can formulate his own exact sales words.

No set rule has obtained as to the length or the hours of the company classes. Some companies conduct the classes from 8 until 9 or from 8:30 until 9:30 in the morning; others conduct them from 1 to 2 in the afternoon, still others conduct them from 4:30 to 5:30 or from 5 to 6 in the afternoon; while some of the classes are being held in the evening.

While the classes are held on different days of the week, taking the New England companies as a whole, Monday and Saturday seem to be the most popular. In some companies, the classes last a half hour, in others an hour, in still others an hour and a half, while a few classes last as long as 2 hours. Depending upon the length of time allotted to complete the course, some companies have 1 meeting a week, while others have 2 or 3 meetings a week. The textbook was prepared so that it is quite flexible as to the length of each session.

While many of the companies have not yet completed their classes, have there been any constructive results that are already apparent? At a recent sales managers' conference in Boston and at 3 recent regional conferences of the class instructors, the following observations were made regarding the effects of the course upon various salesmen:

1. Much better prospect lists are being made.

2. The work is being planned better.

3. Greater self-confidence is developing because of the textbook's material.

4. The textbook has recalled to veteran salesman various important ideas and methods which they knew and used at one time or another which they had ceased to use, but which they are now using again profitably.

5. New men joining the sales staffs of the companies are finding the textbook an excellent means of more quickly orienting themselves to the atmosphere of successful gas appliance selling.

6. The salesmen are thinking more because of the class discussions and the alternatives presented by the textbooks.

7. The course has raised sales employee morale because it indicates that the New England gas industry means business, means to build it and will provide the means whereby to do it, even though this objective requires long preparation and a substantial investment.

8. Some of the men have become definitely interested in self improvement and are securing some of the books on psychology and public speaking which are given as reference in the salesman's textbook.

Many companies have expressed a desire to review the textbook next fall and review material will be sent to them by Labor Day.

A number of the companies have also requested that Boston University and the Association prepare a written examination which each salesman who took the course can take and this also is being done. Engrossed certificates will be awarded to those who pass this written examination and an oral examination with a satisfactory rating.

The following excerpt from President Fletcher's Foreword to the salesman's textbook may be of interest:

"The life blood of any industry is its ability to sell—to understand and develop the art of selling as applied specifically to the requirements of its own business. There are available many excellent books and courses on the principles and refinements of selling. However, there has not been available a *complete* program with a textbook on the art of selling *gas* appliances."

Dean Lord of the College of Business Administration of Boston University made the following interesting comment in his Introduction in the textbook:

"It may not be realized that most of the professors in our colleges of business administration today have come into the teaching field from business and have many years of successful accomplishment to their credit. As a part of their college work, they are closely in touch with business organizations of all kinds in a research and in an advisory capacity. There is today a very definite and practical welding of the background of the college of business administration with the background of modern industry in all its ramifications."

Clifford Johnstone, Managing Director of the Pacific Coast Gas Association, learned of the sales training program through a short news item in one of the gas journals several months ago. At his request, we sent a copy of the 2 books to him. He wrote to us several weeks ago, explaining that he lent these copies to the educational director of a large Pacific Coast gas company, but that this man liked the material so well that he wished to keep it. Mr. Johnstone asked whether, if any of his member companies wished to purchase the books, they could do so. Our Sales Development Committee replied that, if any of his member companies wished copies, we would supply them. Within a few days, 6 Pacific Coast companies ordered a copy of each book and 1 of the companies ordered 60 textbooks and 11 instructor's guides.

The comments which the sales managers and the class instructors of the New England gas companies have made regarding the sales training program would suggest that the substantial investment of the time of many people and the money of many companies which its creation required had been distinctly worth while. These comments also suggest that the New England gas industry intends to keep its batting average well over 300% in the modern industrial game—to occupy the "charmed circle," as they say in the big leagues!

Pipe Corrosion & Coatings

Pipe Surface Preparation—

Part 25

By Erick Larson

THE APPLICATION of pipe coating may be divided into several phases which may appear simple from the terminology but justification of the cost of a protection depends upon following the proper technique in every detail. A thorough knowledge of the purpose of each phase and a complete understanding of the relationship of each to the other is essential if the added life known to be possible with protection is to be secured. This basic knowledge is necessary to the person supervising the actual application and the designer alike. The general divisions of application are preparation of the pipe surface, preparation of the material used for protection, application of material to the surface, inspection, touching up of defects and burial.

Preparation of the Pipe Surface—Pickling

Pickling is a chemical method of removing scale, corrosion and other foreign materials from the metal to provide a surface to which protection will adhere with a maximum of strength. Caustic and acid solutions are used but acids are the most common.

Facilities for the proper cleaning of pipe surfaces can be most effectively and economically provided at the mill. The quantities to be treated at a pipe mill also make it possible to have more efficient inspection and supplement experience with laboratory study of problems.

The most common and an effective method is to dip the pipe in weak acid solutions and then in a neutralizing bath followed by washing.

The washing process must remove all traces of acids or salts which may remain after the pickling is accomplished. The pickling process must remove all rust deposits, scale, oil or other foreign materials. The object of any such process is to provide a surface consisting only of the parent metal and in such a condition that a bond with the primer is possible over every minute area of the surface.

The use of water for a washing or rinsing agent may cause the surface to corrode almost immediately. Also dryness is essential for proper bond. A pickling process developed in Europe was described in the "Oil and Colour Chemists Journal," conference number (1937) pages 34-44. Descaling and removal of oils is accomplished by dipping in a dilute sulphuric acid bath. The pipe removed from the acid is dipped in fresh water maintained at 60 degrees C. After removal from the water the metal is immediately immersed in a bath containing 2% free H_3PO_4 and 0.5% dissolved iron. This bath is maintained at 85 degrees C. Any traces of acid or salts left may cause a breakdown of a paint or primer. The use of dilute phosphoric acid is claimed to free the surface from any remaining acids or salts which are injurious to the metal surfaces or adhesiveness of the coating. The heat and nature of the bath aid in securing a dry surface. Dryness is particularly necessary before applying any phase of protection. The use of the phosphoric acid bath is also claimed to provide the metal surface with a resistance to rusting for a reasonable time unless exposed to liquid water. This process is claimed to be more economical than sand blasting.

The pickling process of cleaning is more adaptable to mill practice than either central station or field practice. It has been used to remove paint from tanks exposed to the atmosphere and for such purposes was more economical than mechanical cleaning by means of especially designed chippers or wire brushing.

Subsequent to the pickling process the primer should be applied as soon as thorough drying has occurred. In specifications it is desirable to require the priming to be continuous and follow pickling by a comparatively short time interval. Where practical conditions are such as to require the conveying of pickled pipe to another location, even at the same mill, for priming the pipe should be carefully inspected for any foreign matter and particularly oil on the surface after transportation. Mechanical cleaning should then be used to remove any corrosion which may have occurred even in the short time interval.

Mechanical Cleaning

Mechanical cleaning removes the scale, corrosion and other foreign materials from the metal surface by physical forces such as pounding and erosion. The mechanical action may be produced by manual labor or machine. The machine may apply a force directly to the pipe surface or indirectly such as in sand blasting.

Manual labor can accomplish the same purpose as a machine but the cost is prohibitive when cleaning is extensive, and therefore, is used only on small areas. However, for touching up, on field joints and when connections are made to protected lines it is practically impossible to use even especially designed cleaning machines. However, in such instances pneumatic or electrical chippers or rotors are frequently and effectively used.

Hand or manual cleaning is frequently used on surfaces which have been unprotected and therefore may be covered with layers of the products of corrosion or adhering material which clings tenaciously to the pipe. Ball pein hammers are excellent tools with which to remove this tenaciously adhering material. Some such materials may be removed in large pieces by the flat end of the hammer. Others require the striking with the

rounded end of a ball pein hammer. In such instances the blows should be controlled so as to avoid unnecessary depressions or craters in the parent metal. The use of chisels or sharp edged hammers such as stone cutter's mauls should be avoided.

When the hammering does not completely remove the corrosion a wood rasp is frequently used to clean the surface of the remainder of the tenaciously adhering material. When the material covering the surface is of a soft and thick or thin and brittle nature the hammering may be unnecessary and the rasp alone will be effective. The soft material may be a deposit of material originating in the surrounding soil rather than a product of corrosion. The soft material will have a tendency to clog the rasp unless the direction of scraping is proper. The scraping should progress in one direction only when clogging occurs and that direction will be such that the cups formed by the teeth of the rasp will not fill. The weight should be placed on the rasp as it is being drawn toward the operator rather than moving away from.

Even though the surface may appear to be perfectly cleaned by a rasp or rough file, a wire brush is usually used to remove all materials from the furrows caused by the filing. On some pipe particularly that which has been submerged or in very wet soils a pickling action has continued and there is no deposit of the products of corrosion. Such pipe is merely covered with loose foreign matter and such corrosion as occurs almost immediately on exposure to the atmosphere. Such surfaces may be effectively cleaned by first wiping the surface of all loose material with rags, allowing the metal to thoroughly dry and then wire brush. Practically a polished surface is frequently secured by such a method. A polished surface is preferable to one roughened by filing or hammering when considering the bond of a protection.

The wire brush used is preferably of the stiffest bristles obtainable as the action must be an erosive one not merely the scrubbing of loose material from the surface. The direction in which the wire brushing is done depends on the pipe condition. A comparatively smooth surface allows brushing longitudinally which is the easier and quicker. When the pipe is slightly corrugated or grooved from any cause the brush is worked so as to follow along the groove or corrugations not across.

A roughness of the metal surface is not necessarily the preferable characteristic to provide for good bond. A polished surface has been demonstrated as providing all the necessary qualities for the strongest bond obtainable. The nearer such a condition can be approached the stronger will be the bond.

Sand Blasting

A step between hand and mechanical cleaning is sand blasting which projects hard sharp sands against the metal surface at a high speed. Air under pressure is used to move the sand.

A water trap between the source of compressed air supply and the sand chamber is desirable to avoid excessive moisture on the metal surface especially in damp weather. The sand is kept as dry as possible to avoid moisture on the metal surface and also to assure the sand flowing with a minimum power requirement.

The sand used is as carefully selected as a sandpaper would be for the finishing of varnished surfaces to assure a proper metal surface and also to provide a minimum of maintenance and operating expense. A particularly hard or thick layer of material to be removed from the metal surface would suggest the use of a heavier sand than one which required removal of only a thin layer of rust. The object of polishing rather than roughening of the surface may be advantageously kept in mind when selecting the sand to be used. Specially prepared sands are used rather than those which may be more conveniently at hand.

The metal to be sandblasted is arranged in a manner which will allow recovery of the sand which may be reused when not mixed with too much foreign material. Cleaning or sifting is sometimes resorted to in separating the sand and foreign matter. The flotation method is not always satisfactory as the dust and vegetable matter may be removed but the heavier particles of metal or products of corrosion remain in the sand.

Recovering the sand, when feasible, is accomplished by placing a heavy canvas mat beneath and away from the pipe in the direction of the flow of sand. The metal is kept at a distance from the receptacle to avoid wearing the canvas. Where the sand blasting is done at a central station or pipe mill the floor and walls near the blasting operation are of a more permanent nature than canvas and the sand is recovered by shoveling.

Safety precautions are essential. The operator is required to wear heavy shoes and clothing. The hands and face are further protected by shields. Other persons are required to keep at a distance from the sand blast. Sand blasting which makes use of silicious sands for the eroding material requires special working conditions in some states. The fine dust may expose workers to silicosis. The general consideration is to remove all dust from the vicinity of operators or nearby workmen. Filters over the nose are not considered satisfactory in most states. Enclosure of the area of dust, suction fans to remove the dust and filters for removing the dust from the air are frequently specified. Where such precautions are necessary, sand blasting is not ordinarily economically justified.

When the metal is in the form of a pipe, speed and economy are improved by having the gun mounted so that it may be moved horizontally along the pipe axis but clamped or set in so far as a movement transverse to the pipe is concerned. With such a mounting the pipe is rotated. The purpose of such an arrangement is to have the gun vertical to the pipe axis and pointed at the pipe center so that the sand is aimed directly at the surface. Angularity of the sand adds to the distance to be traveled and subtracts from the force of the blow. The curvature and rotation of the pipe provides sufficient angularity to avoid excessive erosion at any one point. The operator can give the greater part of his attention to the effectiveness of the cleaning operation having only to control the speed of rotation, the rate of sand flow and occasionally move the gun along the pipe to clean any area not fully treated as the pipe passed through the sand blast. The pipe is moved longitudinally through the sand blast as it is rotated.

Specially designed apparatus including the flexible hose connections and guns are essential for the best results and highest economy. Home made apparatus is seldom as efficient as that produced by equipment manufacturers, who are specialists.

Sand blasting is not as commonly used for cleaning pipe surfaces as it has been in other industries where a more or less flat surface is to be prepared. The reason most frequently given is that for the general conditions encountered other methods are more economical and as effective.

Pacific Coast Gas Association

Northwest Conference Submits Constructive and Varied Program

OPTIMISM about the future of the gas industry was expressed by a score of speakers at the annual Northwest conference of the Pacific Coast Gas Association held June 16 and 17 in the auditorium of the Public Service Building, Portland, Oregon.

Host company for the two day affair was Portland Gas & Coke Company with John J. Winn, Jr., commercial manager, and Charles H. Gueffroy, assistant to the president, serving as the committee in charge of arrangements.

Highlights of the national program, gas advertising, selling, production, and customer contacts were presented by well-known leaders in the fields.

Norman R. McKee, vice-president, Southern Counties Gas Company, and president of the Pacific Coast Gas Association, presided.

Research activity of Portland Gas & Coke Company in its new pilot plant at Linnton, a miniature gas generator for discovering new by-products and improving those now produced, was praised by leaders of the gas industry.

Operation of the pilot plant, the first of its kind to be installed in a manufactured gas plant on the Pacific Coast, was described by E. L. Hall, operating manager. He took delegates behind the scenes in the chemical research which is pioneering new fields for the gas industry.

More than 100,000 horsepower in natural gas engines—using the same gas that flows through the mains to serve ranges, water heaters, refrigerators, and other appliances—have been placed in operation in the Los Angeles area in the past six years and the gas engine business is growing rapidly despite low cost electricity from Boulder Dam.

This review of the latest development of the gas industry in increasing its load with engines operated with natural or manufactured gas was given by Willard F. Suess, supervisor of gas power sales, Southern California Gas Company, Los Angeles.

"In the past few years, the use of natural gas engines has more than doubled in the Los Angeles area in total horsepower installed," explained Mr. Suess. "This has been accomplished despite low cost power from government hydro-electric plants.

"The value of the natural gas engine—and that applies also to the manufactured gas engine—is its all-around dependability and cheapness of operation. A natural gas engine will operate continuously and indefinitely with reasonable maintenance.

"Most of the natural gas engines installed recently in Los Angeles are fully automatic. They are operated by clocks which turn on the gas in the morning and turn off the gas at night. The gas engine is extremely simple.

"One firm in Los Angeles has demonstrated the economy of the natural gas engine in a typical way. With this 40 horsepower engine, the company generates its electricity, with the waste heat it heats its plant and all the hot water needed. This is accomplished at less cost for gas than the cost alone of electricity for the plant at the low industrial rates."

Featured on the advertising session program were Vernon Churchill of McCann-Erickson, who spoke on "National Advertising and Local Tie-in;" R. B. Elliott of Portland Gas & Coke Company and N. O. Fratt of Seattle Gas Company, on "Cooperative Newspaper Advertising."

Papers dealing with problems of gas manufacture were read by A. B. Allyne of San Francisco, chairman of the technical section, and F. C. Hawks of the Washington Gas & Electric Company, Tacoma. N. H. Wardale, superintendent of the Portland Gas & Coke Company's production bureau, was chairman.

Industry's obligation to modern youth in the matter of employment was stressed by R. B. Ambrose of Portland president of the Columbia Empire Industries and principal speaker at a luncheon in the Portland Hotel.

Great strides have been made in dealer-utility relations, A. F. Rice, manager of market development for the Southern California Gas Company told delegates, emphasizing that all a utility expects is an even break in the matter of display and other sales efforts. In the course of his talk he presented a spontaneous sales talk for gas which proved to be one of the hits of the entire conference.

The dealer's viewpoint of cooperative merchandising was presented by R. L. Levy, president, and J. King Bryon, managing director, of the Gas Appliance Society of Oregon. Both attested to the generally prevailing goodwill which exists today between dealer and utility.

Customer surveys and means of improving customer contacts were emphasized at one of the sessions, with George Mackenzie, assistant secretary and treasurer of Portland Gas & Coke Company as chairman. Participating were George W. Smith, of Santa Barbara, district manager for the Southern Counties Gas Company; H. M. Thomas of Northwest Cities Gas Company, Walla Walla, Washington; E. J. Ludeman of the Washington Gas & Electric Company, Tacoma; and R. E. Fisher, who had previously described plant for the Golden Gate International Exposition.

"Home Service as the Newspapers See It," was the title of a paper presented by Ella Lehr of San Francisco, who is in charge of the Botsford, Constantine & Gardner test kitchen.

Optimism for the future of the gas industry, as visioned by its leaders, was revealed by James F. Pollard, president of the Seattle Gas Company, in a closing talk entitled "Crystal Gazing—The National Outlook."

Some Observations on

Modern Methods of Leak Detections

Science and Ingenuity Unite to Locate Trouble Promptly and Economically

By
P. W. Geldard
Distribution Dept., Consumers' Gas Co., Toronto, Ont.

THIS paper is not intended to be a description of the numerous precise instruments used in leak detection, but merely the actual experience and observations on the use of some of them by one company.

The leakage problem seems to fall in four broad steps. (1) The arrival at the scene of the leak in the shortest possible time. (2) The determination of whether there is actually a leak of illuminating gas. (3) The finding of the location of the leak. (4) The digging out and repairing of the leak.

The importance of arrival at the leak as soon as possible after the leak is reported is apparent on the grounds of policy. Time may mean the difference between a serious emergency and an easily controlled leak.

The determination of whether the leak is illuminating gas or not. is of importance as a question of economics. Finding leaks costs money and looking for a leak that doesn't exist is the most expensive form of leak detection. The question is worthy of consideration, because illuminating gas which has travelled some distance through soil may change its odor so as to be indistinguishable from the odor of other substances passing through the soil. This problem is becoming more and more involved with the new and more complex gasolines now on the market.

Finding the Leak

The finding of the location of the leak is also a matter not only of policy and even public safety, but a very real problem economically. Where pipes are under concrete sidewalks in a situation where the gas company must replace the whole sidewalk bay and not merely repair the actual hole made, then an error of six feet in the location of the leak will mean doubling the cost of repairing the leak.

The actual digging out, and the repairing of the leak, is a distinct and separate problem with its own methods, but even here, as will be shown later, some of the leak detection equipment can be of use.

To summarize the above it seems that the whole operation is centripetal in effect, starting from the theory that there may be a leak, and each step narrowing the field of action until finally the leak is uncovered and repaired. It follows then that any step we take, or tool we use, that narrows the circle of our efforts is properly used, while any step or tool that widens this circle at any particular time is improperly used at that time, no matter how useful the tool or method may be when used at its proper time.

All of us have long ago abandoned the classic method of leak detection by the simple expedient of lighting it. We had then to proceed by sense of smell alone, at least in underground leaks. This added greatly to the time and expense of leak detection, as some old timers frequently tell us. To overcome these disadvantages certain precise tools and methods have been pressed into service. All are good when used at the time and place for which they are suited. Among these are the CO indicator, the combustible gases indicator, the Gilmour stethescope, the Hitz aerator and the Schuldt detector. To these should be added the tool which, in want of a better name, the writer calls the Scientific Method. Its use appears essential to correlate and effectively use the other methods.

Leak May Not Be Gas

When a leak is reported the essential thing seems to be whether or not it is illuminating gas. To us, every street leak is considered an emergency that must be worked on immediately, and worked on continuously until the leak is found. It is therefore not of great importance to us to learn whether there is an oxygen deficiency, an explosive mixture or a dangerous percentage of

Canadian Gas Association

The 31st annual convention of the Canadian Gas Association held in Toronto on June 9th and 10th at the Royal York Hotel under the leadership of E. J. Tucker, president with J. D. Van Maur, program chairman, brought together an enthusiastic and appreciative attendance.

Space available in this issue permits the publication of but one of the many interesting papers presented at the several sessions.

Representing the American Gas Association were N. C. McGowan, Alexander Forward, R. M. Conner and also representing A.G.A.E.M., **Merrill N. Davis, President.** ***Officers elected for the ensuing year are: President, T. P. Pinckard, vice-president and general manager, United Gas & Fuel Company, of Hamilton, Ltd.; vice-presidents, Julian Garrett, general manager, Northwestern Utilities, Ltd., Edmonton, and John B. McNary, manager and secretary, Canadian Meter Company, Ltd., Hamilton. George W. Allen, gas survey engineer, Toronto, was reelected secretary-treasurer, a post he has held for 22 years.***

Presented at the 31st Annual Convention of the Canadian Gas Association, Toronto, Canada, June 9, 10, 1938.

CO in any manhole or enclosed space.

We use an M.S.A. CO indicator to determine whether it is illuminating gas or not, and open and vent all enclosed places. Excepting for engine exhausts, and burning insulation on electric cables, the presence of CO means manufactured gas. We notify the complainant and upon occasion the City Health Department that the odour present is not our gas. We make no attempt to tell them what the odour is. We have had cases where, when we arrived no odour of any kind could be detected, but a CO indicator gave a positive indication, and subsequent investigation disclosed a broken service. Again, in very congested and expensive locations we have had our best repair men claim that the odour was illuminating gas, but as the CO indicator did not show a trace of carbon monoxide we have done nothing, and so saved considerable money.

Once we are committed to the fact that there is a leak of manufactured gas, the idea of a scientific method comes into play. The writer admits that time is of paramount importance in finding a leak, and yet it will often be of advantage to spend ten or fifteen minutes sizing up the situation before any work is done. The point where the gas is detected, the apparent path it is following, underground conduits, size of gas main, nature of ground, car tracks, frost, etc., any or all of these may come into play in the causing or spreading of the leak. Any instrument or method loses its effectiveness without an experience and sense of proportion in evaluating the above factors. If there is a twelve inch main and a three inch main close together, the leak is likely to be on the three inch main. If there is a drip near the leak it would be folly to dig anywhere else without testing the drip pipe first. If the main passes near or through a catch-basin or manhole the leak is more likely to be there than in undisturbed ground. A service connection, especially on old work, will be a more probable location than a complete piece of pipe. These may seem obvious and elementary things, but let me assure you that they are not. It is very easy to dig a hole where the odour of gas is strongest, and so get a reputation for industry and initiative.

Use of Stethescope

Underground conduits are probably the most useful method of locating a leak, within say 300 feet. We had one case lately where two leaks were reported within forty-five minutes of each other, from location 1.800 apart. We traced them through Bell Telephone Company conduits, one south for 1.500 feet and one east for 300 feet until they converged at one conduit. The actual leak was 500 feet south of this point. If the leak has been narrowed down to one block, and there are services in that block, the next step is to test each service with a Gilmour Stethescope.

The Gilmour Stethescope consists of ear pieces similar to those on a doctor's stethescope connected to a double diaphragm. The case containing these diaphragms has a standard three-quarter threaded nipple on it for connection to a service. One man can test about ten services an hour by merely disconnecting the inlet of the meter and attaching the stethescope to the meter union on the standpipe. A number of cities have had remarkable success with this stethescope, detecting leaks as small as two cubic feet per hour, and leaks of fifteen cubic feet per hour at a distance of 275 feet. They caution, however, that the training of the operator is the governing factor. Unfortunately this has not been our experience. Using the same operators on all occasions we have had gratifying successes and puzzling failures. The following are a few examples: A broken three inch main heard at seven services, the furthest distance being eighty-five feet. A broken main heard at one service only, although there were two other services within twelve feet of the service the sound was heard at. A six inch main broken at a two inch service connection, the service being twenty-two feet long, not a sound could be heard at this service. A four inch main broken at a one inch service connection, this service being fifteen feet long. No sound could be heard at this service. A broken two inch service fifty-two feet long connected to a three inch main with a three by two tee. The service broken five feet from the main connection. A stethescope was used on the service inside the house and at a one inch bag hole in the main one foot from the service, no sound could be heard. A broken three inch main heard at five services the closest service being five feet from the break. The shortest distance from sound to break was thirty feet and the longest distance was eighty feet. A one inch service seventeen feet long rusted out at the main. A slight sound at the service. No sound at any other service, although other services within ten feet of the one leaking.

It is the writer's theory that the nature of the ground is the governing factor in the success of the stethescope. If the ground is very compact around the leak the gas will escape from the break practically without velocity, there being merely a slow diffusion through the ground. In the case of loose ground or ground with cavities in it, the gas will escape unimpeded with main pressure behind it. In test a broken three inch main on top of the ground can be heard through sixty feet of one inch pipe very loudly. The same break under four feet of loosely filled in ground can be heard at the same distance as a distinct but faint sound. The unburied break passed three hundred and ten cubic feet an hour and the buried break one hundred and thirty-nine cubic feet an hour the ground being sandy gravel and the main pressure five inches water gauge.

Detector Tells Where to Dig

To summarize then it has been our experience that the Gilmour stethescope is one of the most useful aids we have ever had, but that the absence of sound does not necessarily mean no leak in the immediate vicinity. It may also be of interest to note that we have made considerable use of the stethescope for other than leak work. We have determined which of two mains a service was connected to by hammering on one of the mains which happened to be open and listening at the service. We have determined at what point a service at an angle, connected to a main, by hammering the ground at different points over the main and listening at the service. Odd jobs like these have in themselves paid for the cost of the stethescope. We have made some experiments using an amplification system consisting of amplifier, dry batteries, microphonic sounding unit and ear phones. We have not used this device in practice since while the sounds heard are greatly magnified, we feel that the effect of different soils will be proportionately the same as with the stethescope. In addition the instrument is expensive, is heavy and must be handled with care, and demands an experienced operator due to the constant tube noise through which the sound of the leak must be distinguished.

Having determined the location of the leak within say fifty or one

hundred feet, the next problem is to fix the location close enough to warrant digging a hole. This is done by barring or by the use of a Schuldt Detector.

The accurate and apparently fool proof method is that using the Schuldt detector. This instrument consists of two rubber bags connected by a semi-rigid bar eleven feet long. These are inserted into a main through a bar hole, there being three connections carried from the bags to the outside. One of these is a semi-rigid graduated bar for pushing the bags up the main, one is a connection for inflating the bags and one a connection from the space between the bags to a pressure gauge. The bags are pushed up the main and inflated. If there is a leak between the bags the drop in pressure will be visible on the pressure gauge. A leak so small that only one small bubble shows with soap suds can be found with this instrument. The only disadvantage this machine has is that it is necessary to open a hole on the main first before looking for the leak. Especially in the winter time with several feet of frost in the ground this involves considerable time. About one hundred and twenty-five feet each side of the bag hole used can be tested, and leaks located to within six inches by reading the graduation on the bar inserted. One example of its use is as follows: We knew we had a broken main under a wide provincial highway carrying traffic at a fifty mile per hour speed limit. We obtained permission from the highway department to open one 2 x 4 hole in the pavement. We therefore tapped the main in the boulevard and with the Schuldt detector marked the assumed location of the leak. The main was broken in the centre of the hole we had opened in the pavement. In this case the greater part of the gas, as determined by odour, was at the opposite side of the pavement. On systematic inspection of old mains we have found the labor cost to be about six cents per foot, assuming an opening in the main every two hundred and fifty feet. Not the least of this machine's advantages is its value while actually digging out the leak. By leaving the bags inflated one each side of the leak, the excavation and repair can be made without any gas escaping.

Normally we look for the exact location of the leak with bar holes. A bar hole put down with a combination of rotary drill and hammer driven test bar requires only a few minutes' work. Bar holes of about one and one-half inches diameter cost only about fifty cents each to repair in pavement, and one can afford to put down a number of them rather than open a 2x4 hole. We may put down as many as twenty on one leak. After getting the bar hole somewhere near the top of the main we insert a three-quarter inch pipe through which to smell the gas in the bar hole. This is particularly important in the winter time when escaping gas will travel under the frost. A bar hole may be blowing gas, but on putting down the three-quarter inch pipe to the bottom of the test hole it will be found that the gas is not near the main but traveling under the frost.

Claims for Safety Lamp

With the quantitative test by smell in bar holes we have been greatly aided by the use of a Hitz aerator, which sucks the gas and air out of the bar holes by the use of an injector. We have had cases where a dozen test holes had a strong smell of gas in them. By using the aerator in each test hole for, say, two minutes, and so clearing out the ground, the strong smell will be narrowed down to two or three test holes. We can usually get within ten feet of a leak with this method. In addition, it is standard practice with us to use the aerator while digging out a leak to keep the excavation free of gas. We have found this very effective while digging out the first two or three feet, and before the use of a gas mask becomes necessary. It is also our practice after repairing a leak, to aerate the ground in the vicinity through test holes to remove the stale gas from the ground. This has prevented further complaints from customers smelling stale gas and has, we believe, aided in mitigating damage to vegetation.

The problem involving the finding of the location of the leak close enough, to dig one hole over the leak is, we feel, the problem with the most incomplete solution at the present time. Smelling bar holes gives us the location within, say, ten feet, but something nearer is our aim, say, within two feet. We have experimented without success in introducing such things as different odorants into the gas in order to obtain distinctive odour in bar holes, metallic vapors in an attempt to obtain colored flames with a Wolfe Safety Lamp, and fuming compounds to give a smoke indication in test holes. Effectiveness is claimed by the makers for results obtained with a combustible gas indicator having an air inlet valve on it to dilute the gas sample. We have not had enough experience with this type of instrument to warrant opinion, but the cases we have tried have been very gratifying. Handled expertly, this instrument appears to give us the location of a leak within two or three feet. However, a number of cases are needed to substantiate this belief.

This then is our practice in looking for leaks. No attempt has been made to describe the full possibilities or the theoretically possible results obtainable. It was felt that a description of a few actual results would be most beneficial. We do not claim that our procedure is the best possible. The only common denominator comparable between different companies is the number of excavations opened per leak. During the last eighteen months we have averaged 1.78 excavations per leak.

Our Problem: *we have devoted 19 years of our energy and ingenuity to one problem only: the production of an iron oxide that will reduce the purification cost of the gas company. We believe we have solved this problem with the development of* GPM IRON HYDROXIDE, *now purifying 52% of the gas made from Maine to Florida.*

GAS PURIFYING MATERIALS COMPANY, INC.
Long Island City, N. Y. & Providence, R. I.

Timely Sales Chats

By William H. Matlack

In spite of the fact that a great many folks spend a major part of their time bemoaning conditions, here and there are fellows who like Mohammed find that they must go to the mountain.

These are the executives who on the premise of going after business despite hell and high water get their share. They are the men who are sending out some swell promotion these days, who realize that to cut advertising and promotion expenses when business is dull is not only silly but just plain dumb. They reason, rightly time to use an advertising promotion barrage is not when business is booming but when it is blue.

"Hot Dog" is the title of a very effective GAS water heater advertisement used recently by the Consolidated Edison Company. We bet that "scotty" "—and low summer GAS rates" got attention.

HOT DOG! now we get HOT WATER when we want it!
"—AND LOW SUMMER GAS RATES FOR AUTOMATIC WATER HEATING"
SPECIAL LOW PRICES LESS $10.00 TRADE-IN
Allowance for your non-automatic water heater
Just open the tap and hot water flows . . . All you want. . . . Any time of day or night. . . . That's fixing!
And with the generous trade-in allowance applied to our new low prices, anyone can now afford automatic water heating with Gas.
SMALL MONTHLY PAYMENTS
Under our liberal deferred payment plan, you can install an automatic gas water heater now . . . and profit by the special low summer gas rates. Easy monthly installments.
This offer is made for a limited time only. Now's the time to do something about it! Mail the coupon today!
ON DISPLAY AT OUR SHOWROOMS
Special features in this advertisement available only to our gas customers. We supply Manhattan, Bronx, Westchester, and parts of Queens.
FREE SURVEY AND ESTIMATE . . . to show you how little it costs per month. Send the coupon to have our representative study your water heating requirements.
NO TIME TO LOSE! MAIL COUPON TODAY!
CONSOLIDATED EDISON COMPANY OF NEW YORK, INC.

Original 3 Col. 14½ in.

Laclede Gas Light Co. has been running some GAS refrigerator advertisements that register as we see them—good illustration not a whole raft of copy—facts and prices all in sizable space.

*The plan is the thing these "priming days," if you expect to keep the old sales chart anywhere in line * * * To get business takes more calls, but in a number of cases we have heard of recently, that old system is working. One man that we know of put on special men and sent them out to territories with explicit instructions to call at each and every house in a given territory—from door to door they went making about three or four times as many calls per day as his regular men—a lotta work, but they are, as this is written, bringing in orders and causing the fair-haired boys of yesterday who said you can't sell anything, hang their heads a bit.*

A display of the Cincinnati Gas and Electric Company reminds us that we do not hear as much talk about the commercial load as we did not so long ago. To our way of thinking this is an ideal time to do some very good work in the commercial field. Small shops and factories, bakeries, hotels and restaurants are all seeking ways and means to cut expenses and in-

You can save money YEAR AFTER YEAR because — — —
Servel Electrolux
THE GAS REFRIGERATOR
GIVES MORE YEARS OF SERVICE .... AT LESS COST!
TRADE IN YOUR OUT-OF-DATE EQUIPMENT FOR A NEW 1938 SERVEL ELECTROLUX ....
$15 to $50
$25 to $85
The LACLEDE GAS LIGHT COMPANY

Original 4 Col. 15½ in.

Patty cake, Patty cake, Baker Man
He uses GAS when ever he can
Because he knows by using GAS
HIS products will the real purpose
RESULTS COUNT
Gas
PREFERRED

crease efficiencies. Displays like the one shown, a Cooperative Displays creation it would seem is very timely. The slogan used on the right center panel is particularly apropos too, we think: "Where RESULTS COUNT you will find GAS PREFERRED."

The Ohio Fuel Gas Company goes a bit "rhymey" in one of their GAS water heater advertisements — pretty attractive, interest provoking, small advertisement this.

Right now is the time for us to think about a bang-up GAS range activity. Generally speaking and for reasons unknown women seem to think a lot about new GAS ranges, come September and if we are wise we will begin to think about what we are going to do to change her yen for a new range for an order for one. Perhaps, as we suggested elsewhere "A Round-up" of those nine million old ranges in September would be in order, our objective being to replace them with new CP GAS ranges.

In that a major amount of the GAS home heating jobs are closed in September we will do well to keep folks reminded from now on that the ideal way to banish all heating problems is to install a GAS conversion burner in their present furnaces or to install a modern "tailor made job" * * * Several companies have been hammering away on house heating since May and they report that results have been satisfactory.

Harking back to GAS ranges we can see no reason why, even in "recessions," we should resort to "horrible sacrifice sales" to sell the modern GAS range. The range as you well know is far superior to anything that a woman can get in the way of a cooking appliance; it will do so many tricks and has so many features that it makes us fellows who had to build a sales story around the old black box type range wish we were out pushing door bells again—perhaps we ottabe * * *

THE STORY HERE IS ONE OF OLD— HIS TEMPER'S HOT, THE WATER'S COLD!
OW!
BUT-
THIS MAN DOES NEITHER RANT NOR RAVE— THE WATER'S ALWAYS HOT TO SHAVE
AND
THE REASON IS AS CLEAR AS GLASS— AN AUTOMATIC HEATER FIRED BY GAS.
Whether you start the day right or wrong often depends on the hot water supply for the morning shave. Assure the right start every day in your home with the never failing hot water service of an automatic storage gas water heater. Now you can save $10.00 on the popular 24 gallon size at —
The Gas Company

The Rex water heater folks are offering their dealer customers via a clever little folder: "A Helper with 200 Degree," a "Hot Water Guide" which is a specially designed immersion thermometer. The suggestion is that it be used by salesmen as a door opener to get over the story of Automatic Hot Water Service by GAS.

Illinois Iowa Power Company offer to install a conversion burner on a rental plan after a survey of the customer's home heating requirements * * * And again referring to Consolidated Edison we find that company offering a "$12.50 Reward" for old ice boxes. We'll bet those advertisements were read.

Via Special Delivery we receive a "Join The Swing To Heating By GAS" button from the Bryant folks along with word to "be on the look out for a Western Union Messenger who would deliver us a portfolio containing a host of Advertising and Selling Helps." We were on the look-out and when the portfolio came and we examined it we proclaimed it a wow. Tucked in the portfolio we found everything that a fellow could wish for who really wanted to stage a drive to sell GAS home heating, from proofs of mats to suggested group sales plans and best of all the size of the portfolio was such that it fits snugly in our file.

This is the season of the year when the gas man should lay down his barrage of house heating advertising. Sales of gas home heating are largely consummated between the first of July and the last of December with September on the average being the month in which the major number of orders are booked. * * Manufacturers of home heating equipment are about ready with their plans. * * Get them lined up now and start a continuous and consistent advertising-sales-promotion activity. * * Regardless of pared advertising budgets and patter of dull times someone somewhere in your city is thinking of forever banishing the cotton gloves and all that go with them when they have to tug, heave and haul at an old coal furnace, or to jim around with the gadgets on an oil one. They are pretty well fed up on having indifferent supply of heat for their homes. * * Right now is the time to pave the way for your heating business this coming fall. * *

Determining Dew Point

(Continued from page 19)

square inch. A suitable window permits direct visual observation of the mirror. This window, which must withstand the full gas pressure in the apparatus, is made of "Lucite," a thermoplastic organic resin of sufficient strength and transparency for the purpose. As a test for suitability of the Lucite, the apparatus was given a 6-hour sustained pressure test of 3,000 pounds per square inch at room temperature. The Lucite showed no signs of failure.

Because of the high thermal conductivity of the copper cooling tube, the mirror is cooled below the temperature of its surroundings and thus provides a cold spot for the condensation of moisture. It will be observed that the mirror contacts the thermometer-well fitting through a stud which is only about one-third the diameter of the mirror. As stainless steel is a relatively poor thermal conductor, this arrangement tends to maintain the central portion of the mirror at a slightly lower temperature than the outer portion, with the result that the dew first appears on the central portion of the mirror and its detection is aided materially by the contrast afforded.

In the use of this equipment it is necessary to observe the usual precautions attendant on any type of dew-point determination. The more important of these are to make sure that (1) a proper sample is taken from the pipe line, (2) that the temperature of the sampling line is not below the temperature of the gas in the pipe line, (3) that the sampling line does not contain any condensed water, and (4) that there is no material reduction in pressure between the gas source and the dew-point apparatus.

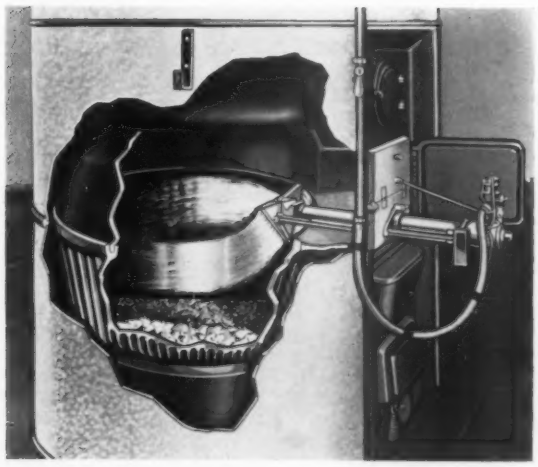
Dew-points may be determined with an accuracy of 0.2° F.

HOTEL CHELSEA
FROM $6.50 WITH MEALS & BATH
$3.50 ROOM ONLY & BATH
PER PERSON 2 IN A ROOM
AS FRIENDLY AS YOUR HOME — with
diversion for every member of the family . . . Concerts and dinner music by artists of Phila. Orchestra • Luncheon served guests in bathing attire on open air dining terrace • Restricted beach • Bathing from rooms • Dancing • Bar • Sundecks • Social Director • Kinderpartner • Noted Cuisine •
SPECIAL WEEKLY RATES
ATLANTIC CITY
JOEL HILLMAN • J. CHRISTIAN MYERS • JULIAN A. HILLMAN

VACATION TIME...
JULY 1938
SUN. MON. TU. FRI. SAT.
and a Good month to start using LAVINO "ACTIVATED" OXIDE!
It costs no more . . . yet it saves on cost of handling . . . it removes a greater amount of H_2S . . . it purifies a greater number of cubic feet of gas per pound of oxide!
Before you go away, let us show you how Lavino "Activated" Oxide fits your plant size and needs. A note on your letterhead brings you all data. No obligation, of course.
E. J. LAVINO and COMPANY
1528 Walnut St., Philadelphia, Pa., Chicago • Pittsburgh

HOTEL
AUDITORIUM
The Location Preferred
EAST SIXTH AND ST. CLAIR AVENUE
Opposite the new Civic Auditorium, and convenient to all important social, recreational, and business activities. Three excellent restaurants. Visit the unique Alpine Tavern.
300 ROOMS
WITH TUB & SHOWER BATH $2. $2.50 $3
H. F. MOORE, Mgr.
Newest in Downtown CLEVELAND

New Equipment and Appliances



Handley-Brown Spring-Fall Gas Burner.

New Cooper-Bessemer Compressor

Unusual interest in Cooper-Bessemer's new Type G-MV Compressor Unit was evidenced during the recent Petroleum Exposition at Tulsa. Displaying a Semi-Diesel pumping engine, a new 40-50 horsepower vertical compressor, a small compressor for furnishing starting air, and a four-cylinder unit of this new Type G-MV Compressor, the Cooper-Bessemer building was a busy place every day of the week and the last named unit garnered a large share of the visitor's attentions.

A two-cycle, gas-engine-driven compressor combining V-type power cylinders set vertically, and compressor cylinders arranged horizontally, this addition to the company's line of engines and compressors is rated 100 horsepower per cylinder at a conservative speed of 300 rpm. It is said to be a thoroughly engineered answer to the oil and gas industries' constant requests for greater horsepower in smaller compressor units. Extreme compactness serves to make the G-MV Compressor readily transportable, reduces the amount of floor space and materials necessary for its housing, lowers foundations material expense, and makes for welcome ease of installation. Shipped completely assembled, except for attaching the compressor cylinders, its factory alignments need not be disturbed and the unit is quickly and easily made ready for operation.

Designed primarily for compressor operations which include compressing air and gas, pumping wells by air and gas lift, delivering oil and gas to main lines and transporting them through long pipe lines, repressuring oil sands, and similar operations, these G-MV units also have numerous industrial applications such as furnishing power, compressing air and refrigeration gases and driving generators and pumps.

The builders offer these compressors in sizes of four, six and eight cylinders with a range of 400, 600 and 800 horsepower respectively. For descriptive bulletin write Cooper-Bessemer Corporation, Mount Vernon, Ohio.

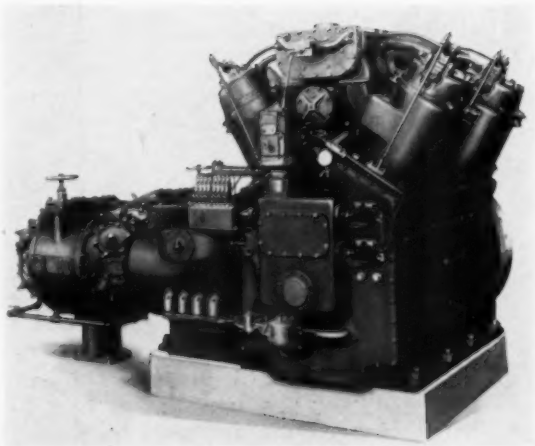
H-B Spring-Fall Gas Burner

The Handley-Brown Spring-Fall gas burner shown herewith has been designed for Spring and Fall house heating in northern climates and for all season heating in warmer climates. Applied as a conversion burner to solid fuel furnaces, the installation is simple and inexpensive. Grates are not removed and ash pit door is not touched. The burner is quickly and easily removed or replaced so that the user can revert to solid fuel if desired during the cold months.

The heat from the gas flame is generated in the lower part of the fire box at the base of the heat transfer walls. The flame is directed from a drilled port burner, which is shaped to spread the flame around the fire box just above grate level. This method utilizes the whole heat absorbing area and contributes considerably to the high efficiency of this appliance.

An automatic electric valve and heat accelerating wall thermostat controls the gas supply. An automatic pilot is furnished that breaks the electric circuit to the main gas valve, causing it to close in case the pilot flame goes out.

Full details are given in Bulletin A-42 of Handley Brown Heater Co., Jackson, Mich.



Cooper-Bessemer Type G—MV Compressor

News of the Industry

Lone Star Gas Company Wins Gas Rate Case

The decision of the United States Supreme Court in Lone Star Gas Company gas rate case handed down May 16 was a complete victory for the company after six years of litigation instituted by the Texas Railroad Commission in 1932.

The court decided in effect that the jury verdict and judgment of the 53rd District Court of Austin, which held in 1934 that the Commission's order reducing the gas rate from 40 cents per thousand cubic feet to 32 cents was unreasonable and confiscatory, should *not* have been set aside by the Third Court of Civil Appeals at Austin.

The high court ordered: "The judgment of the Court of Civil Appeals is reversed and the case is remanded for further proceedings not inconsistent with this opinion."

Gas House Heating Drive

Laying the groundwork for the most intensive drive for gas house heating sales ever undertaken in Indianapolis, the Citizens Gas and Coke Utility has recently employed additional salesmen, engineers and supervisors and held training school for the entire personnel of the department.

With this greatly increased man-power and supervisory staff, plus the advantages of a low heating rate, an unquestionably superior fuel, and aggressive sales promotion, officials of the Utility anticipate an unprecedented growth in gas heating load this year.

Organized and directed by D. D. Piper, newly appointed manager of the house heating department, the training school was held for the purpose of acquainting the men with the engineering principles of heating plants, the technical features of fuel utilization and the technique of selling. The group met both mornings and afternoons to hear lectures on engineering, heat utilization methods, equipment, service, credits, advertising, selling methods and utility policies.

The program included the following talks: "What the sale of gas heat should mean to you," by D. T. Burns, assistant general manager; "You are the gas utility to your prospects," by E. G. Peabody, sales manager; "Credits," by V. C. Seiter, assistant secretary; "Service and installations," by W. I. Battin, distribution engineer; "Public relations," by L. B. Breedlove, director of public relations; and "Relation with appliance sales department," by E. M. Demlow, assistant sales manager.

CONVENTION CALENDAR

July

1-2 *Michigan Gas Association*, Mackinac Island.

27-28 *West Virginia Oil and Natural Gas Association*. Charleston, W. Va.

September

14-16 *Pacific Coast Gas Association*, Annual Convention, Santa Barbara, Calif.

15-16 *Empire State Gas & Electric Assn.* Annual Convention. Lake Placid Club. Lake Placid, N. Y.

October

10-14 *American Gas Association*, Annual Convention, Atlantic City. (No exhibits.)

Meritorious Service Medal

The American Gas Association Meritorious Service Medal, supported by an endowment in memory of Mr. Walter R. Addicks, late Senior Vice-President of the then Consolidated Gas Company of New York, will be presented at the convention in Atlantic City next October.

This Award, consisting of a gold medal and button and a certificate, is the gas industry's official recognition of the gas company employee who has performed the most meritorious deed during the year. Specifically it is awarded for meritorious and conspicuous judgment, intelligence or bravery in saving human life either in the plant or works of any gas undertaking or having to do with the handling of the materials of manufacture or of the products manufactured or distributed. It is available to an employee of any manufactured gas company or natural gas company or manufacturer company member of the Association.

To qualify for the Medal, the deed must have been performed during the period beginning July 1, 1937 and ending June 30, 1938. Application for the 1938 Award should be sent to Association Headquarters on or before August 1, 1938. Forms for the application may be secured upon request.

Rutherford Elected Director of Regional Advertisers

R. J. Rutherford, Vice-Presdent, Worcester Gas Light Company, Worcester, Mass., has been elected a Director of Regional Advertisers, Inc., sponsors of the Mystery Chef radio program, to replace Frank D. Cadwallader, Vice-President, Boston Consolidated Gas Co., Boston, Mass., resigned.

Executive Board of American Gas Assn. in session at Palmer House, Chicago, June 2nd.

Left to right around the table: Merrill N. Davis, Dean H. Mitchell, J. V. Postles, H. L. Masser, A. F. Bridge, F.X. Mettenet, H. L. Dickerson, E. H. Poe, R. W. Hendee, J. F. Rooney, Randall J. LeBoeuf, James F. Pollard, T. J. Strickler, Frank H. Adams, Alexander Forward, N. C. McGowen, Kurwin R. Boyes, George F. Mitchell, George S. Hawley, Henry Obermeyer, W. E. Derwent, N. T. Sellman, C. E. Bennett, C. W. Bennett, C. E. Gallagher, Hale A. Clark, H. P. J. Steinmetz, C. M. Cohn, Herman Russell.

Fred A. Miller Resigns

After more than thirty-five years of service, Mr. Fred A. Miller has decided to relinquish all official duties with the S. R. Dresser Manufacturing Co., Bradford, Pa. His resignation as a director and officer was accepted after a tribute by all his associates to the position of high respect in which he is held by the entire gas industry, and his valuable service to the company.

In 1905, when the S. R. Dresser Manufacturing Co. was first incorporated, Mr. Miller became Secretary-Treasurer. Solomon R. Dresser, founder of the company in 1880, was President.

Following Mr. Dresser's death in 1911, Mr. Miller became President and served in that capacity for eighteen years until 1929, when he was elevated to Chairman of the Board of Directors.

During his long and outstanding association with the gas industry, where he is and has been widely known for years, Mr. Miller served as President of the Natural Gas Supply Men's Association until its affiliation with the American Gas Association. He later became a Director of A.G.A.

As a mark of esteem with which his associates regard him and his contribution to the company's past growth, he has been elected Honorary Chairman of the Board by the Directors of the Dresser Company.

Michigan Associations Elect New Officers

At the joint meeting of Michigan Gas Assn. and Michigan Electric Light Assn. held July 1-2 at Mackinac Island, the following officers were elected for the ensuing year: President, Arthur P. Eva of Benton Harbor; Vice-President, Dean W. Flowers, Muskegon; Sec'y-Treas., A. G. Schroeder of Grand Rapids.

LOST

Millions of cubic feet of Illuminating Gas.

FOUND

Thousands of the Gas Leaks that caused the loss.

BY

NEW ENGLAND FORESTRY SERVICE Inc.
75 Federal Street
BOSTON MASSACHUSETTS

Write Us For Further Details

"Trees, like humans, respond to proper care." **© 1935**

Two-Color Landscape for Gas Industries Exhibit

An effect of color in landscaping through the use of holly and American white birch in contrasting arrangements will characterize the gardens for the gas industries exhibition at the New York World's Fair in 1939.

The design has been executed for Gas Exhibits, Inc., representing manufacturers of gas appliances and gas utility companies throughout the country, under whose supervision the gas industries exhibition is being constructed.

Four varieties of holly ranging from the ground plants a few inches above the ground to holly trees towering to forty feet in height will be employed to produce the background of dark green, with slender white birches and the light green of the birch foliage for contrast. This effect will be further enhanced by the golden and white tones of the buildings and by the contrast of the living flames from the immense gas torch and the waves of flame in which the 90-foot pylons of the "Court of Flame" building are to be wreathed.

The Executive Board of the American Gas Association has approved naming Monday, October 9, 1939 as Gas Industry Day at the New York World's Fair. A program of special activities appropriate for the occasion is presently being considered. Details will be announced later.

Flexible Gas Annealer For Wire

Combining a new uniformity of product, reduced cost and the unique flexibility which gas alone can offer, a new type of gas furnace known as the Square Bell Annealer has recently been installed at the plant of the Wilson Steel & Wire Co., Chicago. The wire, in charges varying from 8000 to 14,000 lbs. in weight, is placed on 4 spindles on a base. An inner cover is placed over the wire and the annealing bell, with the gas burners is placed over all by crane. When up to the heat the outer cover is removed and transferred to another base. A non-oxidizing atmosphere is preserved about the wire, while cooling by the inner cover. The Peoples Gas Light & Coke Co., Chicago, cooperated in making this installation.

Just Foolishness

Editorial by the London (England) "Sphere"

The United States contains 6 per cent of the world's area and 7 per cent of its population. It normally consumes 48 per cent of the world's coffee, 53 per cent of its tin, 56 per cent of its rubber, 21 per cent of its sugar, 72 per cent of its silk, 36 per cent of its coal, 42 per cent of its pig iron, 47 per cent of its copper, and 69 per cent of its crude petroleum.

The United States operates 60 per cent of the world's telephone and telegraph facilities, owns 80 per cent of the motor cars in use, operates 33 per cent of the railroads. It produces 70 per cent of the oil, 60 per cent of the wheat and cotton, 50 per cent of the copper and pig iron, and 40 per cent of the lead and coal output of the globe.

The United States possesses almost $11,000,000,000 in gold, or nearly half of the world's monetary metal. It has two-thirds of civilization's banking resources. The purchasing power of the population is greater than that of 500,000,000 people in Europe and much larger than that of the more than a billion Asiatics.

Responsible leadership which cannot translate such a bulging economy into assured prosperity is destitute of capacity. But pompous statesmen, looking over the estate, solemnly declare that the methods by which it was created are all wrong, ought to be abandoned, must be discarded, that the time has come to substitute political management for individual initiative and supervision.

There is only one way to characterize that proposal; IT IS JUST DAMN FOOLISHNESS.

INDUSTRIAL GAS BOILERS

Tubular or Flueless
¾ to 45 H.P.

P. M. LATTNER MFG. COMPANY
CEDAR RAPIDS, IOWA

Payne Furnace Opens New Test Laboratory

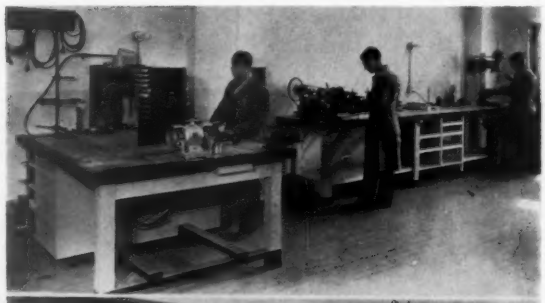
The Payne Furnace & Supply Company, Inc. of Beverly Hills, California, has installed a new and completely equipped test laboratory housed in a two story Class A building which also contains an engineering library and production drafting department.

Opening off the laboratory is a test room, sound and heat insulated, which is used for large scale air delivery tests on winter air conditioning equipment. In an adjoining laboratory, class lecture-demonstrations are presented to the sales, service and installation personnel and frequently to interested groups of dealers and architects.

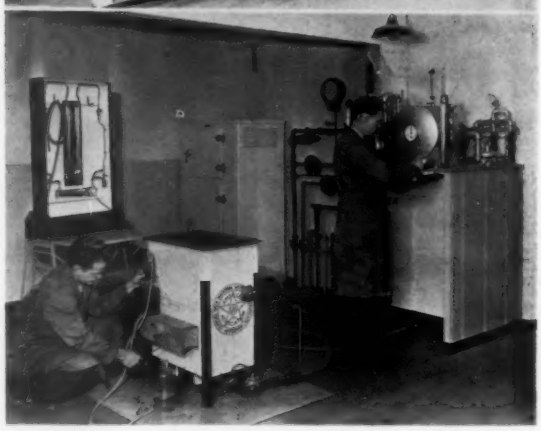
A complete model workshop allows Payne engineers to alter and rebuild test models in the laboratory entirely apart from the factory production department.

Equipment on exhibit includes gas test meters and combustion analysis apparatus, an electrical test panel for determining the characteristics of controls, transformers, and motors, a gas accelerated life testing of safety pilots, a floor furnace fire-hazard test board and air flow and temperature measuring equipment for air delivery and heat balance tests on winter air conditioning equipment.

The completion of the new Payne laboratory was marked by an open house and dinner given to Southern California Gas representatives. Present at the dinner were Guy Corfield, Research Engineer of the Southern California Gas Company; R. I. Snyder, Assistant Research Engineer of the Natural Gas Bureau Laboratory; N. K. Senatoroff, Chief Chemist of the Southern Counties Gas Company; Tom Wallace, Industrial Sales Engineer of the Southern California Gas Company; F. O. Suffron, Supervisor, and F. A. Allen, Assistant Supervisor of the A. G. A. Testing Laboratory, Pacific Coast Branch; John C. Mueller, Testing Engineer, Art Theobald, Chief Engineer, and L. M. Hull, Sales Manager of the Payne organization; and twenty-five staff members of the three gas companies.



Model workshop where Payne engineers alter and rebuild test models.



This laboratory room is equipped with gas test meter and combustion analysis apparatus. In the foreground a floor furnace under test.

Gas Refrigeration in the Movies

"White Banners," released June 20th at the Strand Theatre, New York, is of great interest to the Gas industry. An excellent story by the author of "Magnificent Obsession", Lloyd C. Douglas.

Warner Bros. studio had to import two refrigeration experts from the Electrolux company's plant in the middle west to build a refrigerator.

The engineers brought with them blueprints of several of the first practical automatic refrigerators, or "iceless iceboxes," ever built. From these they built serviceable reproductions, with compressors and refrigeration coils in separate units.

The entire story of "White Banners" revolves around the invention of the automatic refrigerator and, subsequently, the development of the gas refrigerator by a character named Paul Ward, portrayed by Claude Rains.

New Sales Connections for Payne Furnace Company

Mr. Thomas F. Downs, 360 Worthington St., Springfield, Mass., has been appointed factory representative for the Payne Furnace & Supply Co., Inc., of Beverly Hills, California, in the following states: Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New Jersey, and the Eastern sections of New York and Pennsylvania.

Mr. Downs is well known in the New England States, having been for a number of years contacting gas companies and dealers in the interests of the Spencer Thermostat Company. He comes to the Payne Furnace Company with a background of engineering training and experience that should be of much value in his contacts with the trade.

The Sonner Sales Company, in the Peoples Gas Building, 122 So. Michigan Ave., Chicago, Illinois, will cover the middle west to include the Dakotas, Nebraska, Kansas, Minnesota, Wisconsin, Michigan, Iowa, Illinois, Indiana, Ohio, Missouri, Kentucky and Tennessee.

The Adams Sales Corporation, Pittsburgh, Pennsylvania, will act as distributors for Western New York, Western Pennsylvania and West Virginia.

THOMAS F. DOWNS

G. E. Seaberg With Pittsburgh Equitable Meter Co.

Announcement has been made of the appointment of George E. Seaberg as Sales Manager of the Coupling and Fitting Division of the Pittsburgh Equitable Meter Company, Pittsburgh, Penna. Mr. Seaberg's long experience makes him well qualified to head this newly created department. For the past 12 years he was associated with the Dresser Manufacturing Company as Manager of their Water Works Division and prior to that, was with the Peoples Gas Light and Coke Company of Chicago in an engineering capacity.

G. E. SEABERG

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Book Reviews

The National Fire Codes For Flammable Liquids And Gases, 1938. Compiled by Robert S. Moulton. Published by National Fire Protection Association, Boston, Mass. 360 pages. Price, $1.50 postpaid.

This volume includes the thirty-six standards and regulations giving fire protection authorities complete information on the safe handling of both flammable liquids and gases. The several codes are in the form of suggested ordinances, regulations, or recommended good practice requirements and are purely advisory as far as the National Fire Protection Association is concerned, but are widely used as a basis of law, or as a guide by administrative authorities in the exercise of their discretionary powers, as well as for insurance purposes. Prepared by technical committees including engineers representing all major interests concerned, they are universally accepted as the authoritative guides to the best practice in fire prevention and fire protection.

Of special interest to the gas industry are standards covering (1) liquified petroleum gas (butane and propane); (2) city gas; (3) gas systems for cutting and welding, and (4) fire hazard properties of flammable liquids, gases, and volatile solids.

Comfort Heating—An Engineering Handbook on Gas House Heating and air conditioning. Prepared and published by American Gas Association. 81 pages. Price $2.00 per copy with discounts for 10 or more copies.

This handbook is designed to give in simple, condensed and easily applied form the engineering data needed in making calculations for house heating, air conditioning and water heating. Although intended primarily for those in the gas industry it contains information on coal and oil as well as on gas.

Every salesman, whether he is connected with a utility company or with a dealer, as well as every architect and builder who has plans to use gas for heating, needs some practical, simple method to pick his equipment and to calculate the probable operating cost. This book was written especially for such persons.

The nine chapters into which the book is divided include the following: Determination of Heat Loss from Buildings—Steam and Hot Water Heating—Winter Air Conditioning — Selecting Gas Heating Equipment—Estimating Gas Heating Cost—Data on Competitive Fuels —Domestic Water Heating—Summer Air Conditioning — Physical Units and Tables—Miscellaneous Information.

History of the Gas Industry by Louis Stotz and Alexander Jamison. 534 pages including numerous illustrations. Price—single copies $3.50; ten or more $3.00 each. (Orders should be addressed to Louis Stotz,) c/o American Gas Association, 420 Lexington Ave., New York, N. Y.

This book should be welcomed by the gas industry. There has been a great lack of published historical information generally available on the growth and development of our business. Much has been available in company archives and individual company histories but little of it has previously been correlated.

In 34 chapters the authors cover the story of the growth and development of the manufactured and natural gas industries. Historical sketches and up-to-date maps of 12 major pipe line systems are included.

One section contains a complete resumé of the regulation of public utilities. Other subjects covered are the evolution in sales, promotional, publicity and merchandising methods, the trend in rate structures and their influence on load building and sales, the history of the many domestic, commercial and industrial uses of gas, competitive factors, the importance of the holding company and the change-over from manufactured to natural gas. There is even a glimpse into the future.

The principal author, Mr. Stotz, has spent the greater part of his life in the gas industry. For many years he was connected with the headquarters staff of the American Gas Association and one of its predecessors, the National Commercial Gas Association.

In the preparation of this book he has made full use of his background and connections and the result is indeed creditable.

For those who desire a good background of easily digested factual information on the gas industry, we have no hesitation in recommending this book. It should find a well-deserved place in the libraries of all gas companies, executives and any employees who are interested in improving their knowledge of the industry.

Obituary

C. H. GEIST

Clarence Henry Geist, public utilities executive and sportsman, died June 12th at his estate, Launfal, in Villanova. He was seventy-two years old.

Mr. Geist, who failed to recover from a heart attack two weeks ago, was president and a director of the C. H. Geist Company, Inc., the American Pipe and Construction Company, the Philadelphia Suburban Water Company, the Indianapolis Water Company, the Indianapolis Water Works Securities Company and the Spanish River Land Company.

He was a director of the United Gas Improvement Company, the Lehigh Coal and Navigation Company and the Lehigh and New England Railroad Company; a trustee of the Jefferson Medical College of Philadelphia and a director of the Bryn Mawr Hospital.

When his interest turned to the development of electric and gas properties, he became associated with Charles G. Dawes, former Vice-President, and his brother, Rufus C. Dawes. His interests soon increased in the utility field and he became an important factor in the industry's development.

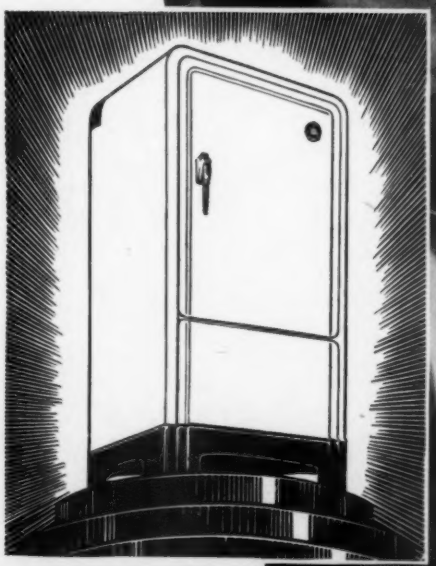
HUGH M. CRAWFORD

Hugh M. Crawford, General Sales Manager of Pacific Gas and Electric Co., died suddenly of a heart attack during a weekend holiday at his summer home at Forest Hills on the Russian River on May 29th. He was 53 years old.

Born in Newcastle, Pennsylvania, Crawford began his utility career in Pittsburgh, following a course in electrical engineering at the University of Nebraska. A quarter of a century ago he came to California to construct an irrigation system in Glenn county and on completion of that project was appointed commercial manager of the San Joaquin Light and Power Corporation at Bakersfield.

Crawford joined the P. G. and E. in 1918 as a salesman and rose to the post of general sales manager in 1925. In that capacity, as a means of building up the company's gas and electric load, he planned and directed sales of appliances amounting to many millions of dollars yearly—programs in which the company cooperated closely with manufacturers, jobbers and some 1500 retail dealers in Northern California and thus substantially increased the business of all.

HUGHES PRINTING CO.
EAST STROUDSBURG, PA.



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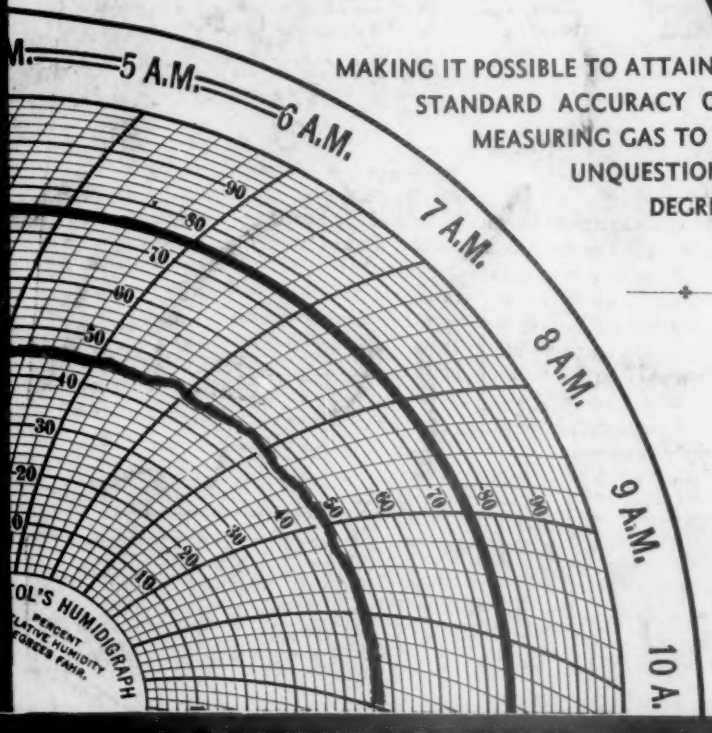

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